

THE KOMAROV
BOTANICAL INSTITUTE
250 YEARS OF RUSSIAN RESEARCH

Stanwyn G. Shetler

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250 Years of Russian Research

by Stanwyn G. Shetler

In the early 1700s Peter the Great established two botanical institutions in St. Petersburg, the city he dared to create a mere seven degrees south of the Arctic Circle. These were the predecessors of the present-day Komarov Botanical Institute, formed in 1931 by the merger of two previous institutions. This book tells the story of the Institute and its predecessors —a glimpse at two-and-a-half centuries of botanical research in Russia.

The author describes the physical setting and intellectual climate of the Institute along with its vast resources: a staff of 700, two dozen major laboratories, a large greenhouse and outdoor garden complex, an arboretum-park, several experimental farms, a 450,000-volume library, and combined herbaria of nearly 6 million specimens, dating back to 1709.

Among the many achievements of the Komarov, the author stresses the completion of the monumental 30-volume *Flora of the USSR*. Prepared over a 33-year period, the *Flora* covers 17,500 species of plants native to the Soviet Union. The author views this work as "the crowning achievement of Russian taxonomy if not of all Russian botany."

The book closes with an outline of the Institute's ambitious plans for the future —including a vast effort in tropical research.

Continued on back flap.

**THE KOMAROV
BOTANICAL INSTITUTE
250 YEARS OF RUSSIAN RESEARCH**



Владимир Л. Комаров
Vladimir L. Komarov (1869-1945).

From Baranov and Bobrov (8)

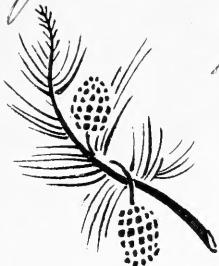
THE KOMAROV BOTANICAL INSTITUTE

250 YEARS OF RUSSIAN RESEARCH

STANWYN G. SHETLER

*Associate Curator of Phanerogams
Smithsonian Institution*

To Nancy Matthews



*Stan Shetler
16 Mar '85*

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*To the men and women
who over the past 250 years have fashioned
a rich tradition of botanical scholarship
in the city of Peter the Great*

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Preface

The roots of science are cosmopolitan, springing from all corners of civilization, and scientific discoveries are recorded in many tongues. Yet too often the scientist is a prisoner of his native tongue, and of necessity his scholarly world is circumscribed by the limits of knowledge set forth in his own language. It is especially easy for the scientist caught up by the momentary pressures of his research to lose sight of the depth and breadth of scholarly traditions beyond the language perimeter of his own tradition. This leads to a provincial view of historical development that has unfortunate consequences both for the progress and for the brotherhood of science. Among the great branches of natural science, taxonomy, more than any other branch, is rooted in historical process, and the modern taxonomic scholar cannot conduct his research outside the historical context or apart from the historical objects of his science—the literature and the specimens. The special prominence of historical scholarship in taxonomy gives a special prominence also to taxonomic libraries and museums (herbaria), where the essential objects of this scholarship are preserved. Perhaps for these reasons taxonomists seem to have an unusual consciousness of language barriers and of the importance of an accurate historical perspective.

In this book I have tried to bridge the formidable barrier of the Russian language and to open thereby a vista of the rich tradition of *botanical scholarship* that has grown up over the past 250 years in the ancient city of St. Petersburg-

Leningrad in the several institutions founded by Peter the Great which have culminated in the present-day Komarov Botanical Institute of the Academy of Sciences of the USSR. Strictly speaking, this is a book about the history of one institution, but it is much more than that. Within Imperial Russia the science of botany essentially took origin in St. Petersburg, and the predecessor institutions, no less than the present Institute, were the leading botanical centers of their time. Thus, it is no exaggeration to say that the landmarks in the history of the Institute are also major, though not by any means the only landmarks in the history of botany in Russia and the Soviet Union.

Little has been written in English about the history of Russian botany, and this account should help to fill the gap. The emphasis is on the history of taxonomy and other descriptive fields of botany. This slant reflects my own bias and limited competence to evaluate the record, as well as the fact that the most illustrious chapters in the Institute's history, from an international viewpoint, have been written in these fields. I have not attempted to write an authoritative, critical history of the Institute—a very difficult if not presumptuous task for any American to undertake even though some intriguing insights might be generated from a foreign point of view. Rather, I have sketched a popular account, covering the highlights in a logical and historically accurate sequence. As in all historical research, it has been necessary to arbitrate sources frequently, and doubtless I have erred in places. Yet the absolute authenticity of every date and event is less important than the overall accuracy of the thread of history woven—the sequence and dynamics of 250 years of evolution and growth.

The specific stimulus for this book was provided by my visit to the Komarov Botanical Institute in July 1964 just prior to the 10th International Botanical Congress in Edin-

burgh (1). But I had not anticipated a publication prior to or even during this visit, and the impression must not be gained that I have presumed to write a book solely on the basis of information gathered during those few days. Actually, the general stimulus for writing this book has developed gradually from more than a half-dozen years of corresponding with botanists at the Institute concerning mutual research interests and from as many years of browsing in Russian botanical literature. The trip heightened my historical appreciation and enabled me to obtain some valuable publications on the Institute and its predecessors, as well as to make certain helpful firsthand contacts. It should be emphasized that most of the information presented here has been synthesized from published sources, and that the research and preparation have taken place entirely since my return from Leningrad.

There is no dearth of literature on the Institute's history for those who read Russian, although the various Russian publications are often difficult to obtain.¹ It seems that the botanical institutions of St. Petersburg-Leningrad have always been fortunate to have on their staffs one or more scholars who were concerned about recording history (see p. 110). Among their most prominent botanical historians have been V. I. Lipsky, whose special work² is still the most exhaustive and authoritative account of the first 200 years of the Imperial Botanic Garden, P. A. Baranov, E. G. Bobrov, D. V. Lebedev,

¹The most recent information was published in the October 1965 issue of *Botanichesky Zhurnal*, in the form of a series of 250-year commemorative articles by different members of the staff of the Komarov Institute. This issue provides a wealth of interesting facts and interpretations.

²Фишер, А. А. (редактор). 1913-15. Императорский Ст.-Петербургский Ботанический сад за 200 лет его существования. 1713-1913. Ст.-Петербургский-Петроград. 3 том. (Fischer, A. A. [ed.]. *Imperatorskiy St.-Peterburgskiy Botanicheskiy Sad za 200 let ego sushchestvovaniya. 1713-1913* ["The Imperial St. Petersburg Botanic Garden during the 200 years of its existence"]. St. Petersburg-Petrograd. 3 vols.) Vols. 1, 3 by Lipsky.

and S. J. Lipschitz. The latter have all played important roles in writing the history of the Institute in the present century while updating the older accounts.

In May 1964, Soviet botanists celebrated the 250th anniversary (1714–1964) of the Komarov Botanical Institute;³ therefore, my visit in July came at a propitious moment in the history of this illustrious institution. I tender this book as a belated tribute to the Institute on the occasion of its 250th birthday.

No account of the Institute's history would be complete without some description of the setting. In the first part of the book I have tried to evoke feeling for the historical setting. This is followed by a personalized description of the modern city of Leningrad.

S. G. S.

January 1967

³A larger celebration was held in Leningrad from the 15th to the 18th of December 1965, in connection with the 50th anniversary (1915–65) celebration of the All-Union Botanical Society (see p. 191).

Acknowledgments

Many persons have had some part in the preparation of this book. To some, I must acknowledge a special debt.

While in Leningrad I was fortunate to make the acquaintance of Arthur O. Chater, University of Leicester, who was nearing the end of a 3-month research visit to the Komarov Botanical Institute as an exchange scholar under the auspices of the Royal Society of London and the Soviet Academy of Sciences. Conducting studies in connection with his work as a principal collaborator for *Flora Europaea*, he had an excellent opportunity to use the combined herbaria and library and to observe the organization and day-to-day administration of the herbarium-library complex. Happily, we were able to spend a long evening together over a bottle of pleasant Russian wine, chatting about the Institute and the city. Chater spoke highly of the Institute and the opportunities it affords. I willingly confess that his help has been enormous.

During my visit to the Institute, Prof. Andrey A. Fëdorov graciously looked after my welfare despite his busy schedule preparing for departure to the 10th International Botanical Congress. Through his courtesy I was able to meet the Director of the Institute, his brother Prof. Aleksandr A. Fëdorov, and together they gave me an orientation tour of the grounds. Through correspondence since my return, Director Fëdorov has kindly responded to my requests by supplying me with invaluable statistical and other factual information on the Institute and its history, and I am especially grateful to him for

providing a large selection of photographs, many of which are reproduced here. Among the other botanists at the Institute who facilitated my orientation, special mention should be made of Drs. I. T. Vassilczenko and S. J. Lipschitz for their assistance in the Herbarium.

My *Intourist* guide, Valentina Lysenko, knew her city well and brought its history to life for me.

Dr. Arthur J. Cronquist, New York Botanical Garden, visited the Botanical Institute for an extended time in August 1965,¹ and he has shared his experiences freely with me. I am also indebted to him for permission to use certain of his photographs.

The manuscript has been reviewed by the following persons to whom I tender sincere thanks: Dr. T. Dale Stewart, Paul Oehser, and William Warner, all of the Smithsonian Institution, and Dr. George H. M. Lawrence, Director, Hunt Botanical Library. The book has been edited by Mrs. Forrest Powars and designed by Frank Dobias, and their expert help is deeply appreciated. Mrs. Gesina B. Threlkeld has drawn both maps for which I am especially pleased. Finally, my wife, Elaine, has rendered indispensable assistance at every turn, and whatever merit the book may have is due in no small measure to her dedicated and enthusiastic help.

Inevitably, errors and misinterpretations will be found, and for these I assume full responsibility. Any interpretations or speculations not specifically credited to a published source are strictly my own and must not be attributed to those who have so graciously assisted in the preparation of this book. Although I have tried to be objective, it must be remembered that much detail necessarily has been omitted and that my viewpoint is, after all, an American one. Whatever bias I have shown must be attributed, I fear, to the accident of my heritage.

¹Cronquist, Arthur. 1966. Russia's foremost botanical garden. The Garden Journal 16: 48-53.

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PART 1

The Setting

CHAPTER

1

The Founding of St. Petersburg

Jn the year 1703, Peter the Great, Tsar of Russia, founded a city on the banks of the Neva River near its mouth at the head of the Gulf of Finland. It was an act of daring and sovereign self-confidence to attempt to create a national and international hub of politics, science, and culture, representing the finest in Russian society, here on the braided delta of the Neva amid the birches and conifers of a vast and barren boreal forest. For this was *subarctic* wilderness lying at 60° north latitude, only about 7° south of the Arctic Circle, and within the perennial grip of a harsh and unrelenting climate. With chilly summers and long, dark, frigid winters, battling the elements had to be a major year-round preoccupation.

Still, the Neva Delta had some points to recommend it. For one, there was the proximity of the gulf and the easy access it provided to the open seas, a major consideration in days before trains and planes. The prospect of a good port for Russia on the Baltic Sea, open at least 6 months a year, outweighed many of the drawbacks of the subarctic location. The river would provide an abundance of fresh water and an inland navigation route. Fish, always a staple in the Russian diet,

were plentiful in the river and gulf. Even the climate posed a welcome relief from the severely continental climate of Moscow, ancient capital (1340–1712) and mother city of Tsarist Russia, where temperatures soared and plummeted to greater extremes. On the Neva Delta, the summers and winters were considerably milder (owing to the ameliorating effects of the Baltic Sea) than latitude alone would dictate. To the tsar, therefore, the site along the lower Neva offered the Imperial Court a more favorable climate and a more strategic location for the conduct of national and international affairs than could Moscow.

Petersburg or *Saint Petersburg*, as the tsar's city was later called, grew rapidly during the 18th and 19th centuries, from a small wilderness outpost into the leading intellectual center of Russia. By 1704 Peter was reputed to have had 40,000 countrymen working on his city, and in 1712,¹ less than 10 years later, Petersburg became the capital of Imperial Russia, which it remained until 1918, just after the October Revolution, when the Bolsheviks returned the government to Moscow. For a few years prior to and following the Revolution (1914–24), St. Petersburg was known as *Petrograd*, but in 1924, after the death of Lenin, the city was renamed in his honor and has since been known as *Leningrad*.²

Peter I, as Peter the Great was officially titled, died in 1725 and did not live to see how much his city was to flourish or what national and international prominence it was to attain in literary and commercial circles, but already his vision had ignited the imagination of his people and his memory has lingered in their hearts even to the present day. Like Ivan the Terrible, he was by times a cruel and ruthless leader, and he is remembered with certain mixed feelings. At the same time

¹This date is sometimes given as 1713.

²St. Petersburg, 1703–1914; Petrograd, 1914–24; Leningrad, 1924–present.

he is generally remembered as a “good” tsar because of his grand vision of Russia and the positive contributions he made; above all, modern Leningraders like to stress his humility, as evidenced by the small summer abode he built for himself which contrasts sharply with some of the sumptuous palaces built by later emperors. Leningrad has various monuments to Peter I, but the city itself is his great legacy to the Russian people and the greatest memorial to him. Of the succession of tsars and tsarinas following him—a number of whom even bore his own imperial title “Peter”—some were less humane and, in the end, perhaps none is remembered so well. Yet each left his mark upon the city, whether good or bad, and together they built a great city. Often trying to outdo their predecessors, the tsars left their signatures on the city in the form of various ornate and lavishly appointed palaces, cathedrals, and state buildings, until St. Petersburg became fairly saturated with imperial edifices.

Some of the cultural and scientific institutions founded by the tsars in St. Petersburg have survived in modified form until the present time and have, in their long history, had a profound influence on the world scene. The famed Maryinsky Ballet of St. Petersburg established an unexampled, pace-setting tradition in the art of the classical ballet, and this tradition has been continued in the modern period by its renamed successor, the equally renowned Kirov Ballet of Leningrad. Very early in its history the city became known as a center of science and scholarship. Its high intellectual and cultural level gave St. Petersburg a special status among Russian cities in national and international affairs. Scholars are no respecters of national boundaries, and their presence made St. Petersburg Russia’s “window to the west,” as Peter the Great had vowed to make it.

European, first German and later French, cultural and

Островъ Каменной

Островъ Аптекорской

Садъ

Ея Величества

Островъ

Петербургской

Островъ
Васильевский



**MAP OF ST. PETERSBURG ABOUT 1725
SHOWING AREA THAT TODAY LIES IN THE HEART OF LENINGRAD**

Drawn by Gesina B. Threlkeld from early midshipman's map,
reproduced in Baranov *et al.* (8).

Place names on map (quotation marks indicate archaic spellings):

«Островъ Каменной» — *Ostrov Kamennoy* — Stony Island.

«Островъ Аптекорской» — *Ostrov Aptekorskoy* — Pharmaceutical Island.

«Садъ Ея Величества» — *Sad Yeya Velichestva* — Garden of Her Majesty [Catherine I, 1684?-1727; Tsarina, 1725-27].

«Островъ Петербургской» — *Ostrov Peterburgskoy* — Petersburg Island.

«Островъ Васильевский» — *Ostrov Vasil'evskiy* — Vassilevsky Island.

scientific influence was deliberately introduced and cultivated by the tsars who coveted the refinement of western Europe and looked upon things Russian with a certain disdain. They brought in many foreign scholars to establish the sciences and arts in Russia. This gave the Imperial Court an international flavor and encouraged a much more cosmopolitan and worldly atmosphere in the Imperial City than could be found in any other Russian city, including the highly provincial Moscow. In many respects, Leningrad today is still the most cultured and scholarly city of Russia and is still her window to the west, although the Soviet Government has striven hard with considerable success to develop other centers of cultural and scientific excellence within the Soviet Union. Particularly, it has tried to restore Moscow to its ancient prominence as mother city and capital of Russian civilization.

Among the acts of Peter the Great that have had lasting significance in the realm of science was the founding of a Pharmaceutical Garden in St. Petersburg about the time it became the capital of Russia. This Garden gradually developed into a major center of botanical research, gaining renown not only throughout Russia but throughout the whole world during the more than two centuries of its independent existence. The founding of this Garden in 1714, which after 1823 became known as the Imperial Botanic Garden of St. Petersburg, signaled in effect the beginning of scientific botany in Russia. Though its fortunes waxed and waned, especially during the early years, it remained the preeminent botanical institution of Russia throughout most of its history. Its present-day successor is the Komarov Botanical Institute in Leningrad, now the principal botanical institution of the Soviet Union. The Institute was formed in 1931 by the merger of the Botanic Garden and the Botanical Museum of the Academy of Sciences of the USSR, also tracing its origin to about 1714 in St. Peters-

burg. Thus, there has been an unbroken tradition of distinguished botanical scholarship in St. Petersburg-Leningrad since the founding of Peter's Pharmaceutical Garden more than 250 years ago, in the days of the great botanist Tournefort and about 40 years prior to the first appearance of Linnaeus' *Species Plantarum* in 1753. During these 250 years, some of the world's greatest botanists—both foreign and Russian—have worked at the Imperial Botanic Garden, Botanical Museum, or, in modern times, the Botanical Institute of the Academy of Sciences of the USSR. Much of the earlier botanical exploration of the arctic and subarctic regions of Eurasia and Alaska was carried out by botanists working out of St. Petersburg, and today the Botanical Institute houses some of the richest early collections for these regions that are known to exist.

In modern times, the Botanical Institute has broadened its scope to include virtually all branches of botanical research, but during the 18th and 19th centuries the Imperial Garden was preoccupied mainly with the description and classification of plants, namely *taxonomy*. This was not unusual inasmuch as the science of botany began with taxonomy, and prior to the 20th century taxonomy was the chief pursuit of botanists everywhere. Even to the present time, however, botanical scholarship in Leningrad has distinguished itself primarily in the area of taxonomy, and today the Botanical Institute can boast perhaps the second largest herbarium in the world.

The average Leningrader does not seem to be aware of his city's great botanical heritage; my *Intourist* guide, who in general was very well informed about the city, had never heard of the Komarov Botanical Institute. But people are people, and the last thing they will do is learn something about their own hometown, particularly when it concerns an intellectual tradition as esoteric and "impractical" as botany.

CHAPTER

2

The Modern City of Leningrad

Today Leningrad is a modern industrial city lying astride the branched mouth of the Neva River and sprawling across the boggy lowlands of the surrounding delta region. The city's present population, including suburbs, is nearing 4 million. Thus, in population it ranks second to Moscow among Soviet cities, but in science, culture, and general worldliness some would rank it first. The boreal wilderness of Peter the Great's time has been pushed far beyond the perimeter of his city, and in its place one sees vast acres of cultivated fields where cabbages and other vegetables are grown. Except for small relict tracts preserved in parks, the original forest has virtually disappeared from the landscape in the environs of Leningrad.

As our *Aeroflot* flight from Helsinki approached Leningrad on a bright July morning, I could easily have mistaken the domestic countryside beneath for prairie wheatland in Montana or Alberta, for all the difference that one could discern from a plane window. There were the characteristic flat, open fields stretching away to the horizon in every direction and spilling beyond, punctuated only by scattered copses of trees

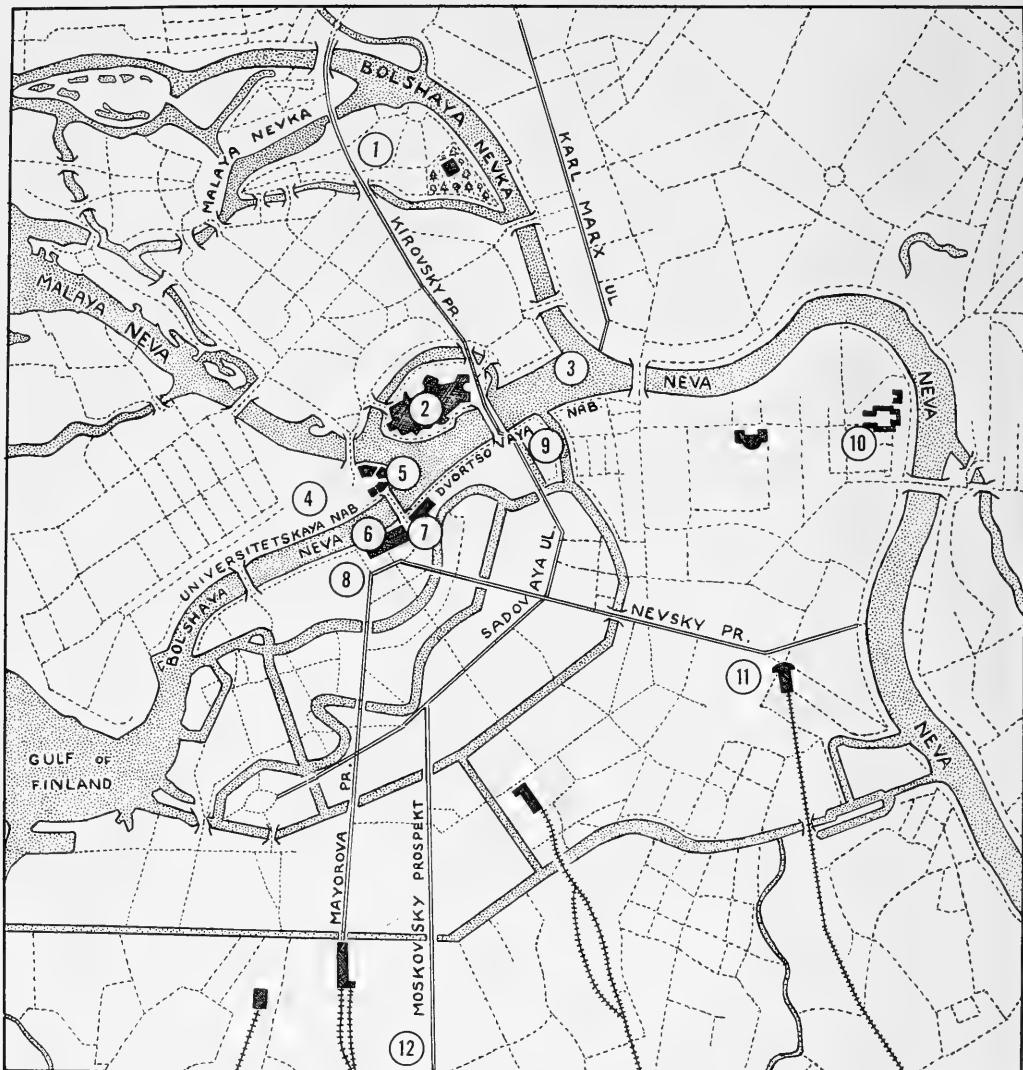
around villages and rural dwellings. One had to look at the vegetation from the ground and feel the cool oblique rays of the polar sun on one's back to appreciate the subarctic latitude and the limitations it imposes upon industry and agriculture. Standing in Leningrad, one is standing, in effect, in Anchorage or Oslo, and I had to keep reminding myself of this when I became prone to criticize the sometimes mangy turfs and monotonous ornamental plantings in the city parks.

Actually, the decorative plantings of Leningrad are quite remarkable. They are well groomed and jealously guarded by the ubiquitous and devoted *babushki* ("grandmothers")—middle-aged and elderly Russian women who practically have the status of a national institution. These women are called "grandmother" as a term of affection and esteem and without regard for any actual blood relationships. They perform a variety of jobs that an American, for example, expects to see a man doing. Among them is policing the city's museums and parks. Dressed in regular work garb and distinguished from the public only by an armband, they roam about apprehending trespassers. One has to admire their proud spirit and the results they achieve.

Leningraders (*Leningradtsy*) are sentimental about their river. To them the storied Neva—strategic trade route and gateway to the sea, lifeline and playground of the people, inspirational haunt of poet and lover, stage of history, and axis of ancient St. Petersburg—is the soul of their great city. Just like the tsars, who built their important residences and state buildings along its waterfronts, the modern residents of the city can't resist the Neva's magnetic powers, and much city life is oriented about it. Many festive events take place on or along the river especially in the vicinity of the former Winter Palace of the tsars. Leningrad State University stands along its banks, and the city's students hold a special esteem for the river.

In the heart of the city, not far from its mouth, the Neva River forks several times, and the major branches divide the delta into a number of islands. A large part of downtown Leningrad is built on these islands, which form natural sectors of the city interconnected by a series of about 120 bridges, some of them very historic. At the first fork around the bend from the famous *Smolny*, where Lenin set up headquarters in 1917 after the October Revolution, the Nevka River breaks off to the north; subsequently, it forks into the Big Nevka and Little Nevka. The continuing Neva forks again in front of the Winter Palace into the Big Neva and Little Neva. The historic *Aptekarsky Ostrov* ("Pharmaceutical Island"), on which Peter founded his Pharmaceutical Garden, is surrounded by various branches of the Nevka and, on the south, by a canal. It was from the Neva, near where the Nevka branches off, that the cruiser *Aurora* fired its guns on the Winter Palace in the token shelling that touched off the Revolution. The *Aurora*, restored as a museum and symbol of victory, now lies permanently anchored along the banks of the river near where it lay anchored on that fateful day.

Leningrad is a rapidly growing city and one sees high-rise apartment buildings going up all around. Great "super blocks," as they call them, are being constructed in modular fashion, each comprising a virtual city within a city when it is finished, being self-sufficient with its own apartments, schools, shops, and services. From my hotel lobby I could see one of these "blocks" going up over what was literally a bog before, and its apartment buildings had very attractive windows and balconies. The architecture of the city is changing from the drab, massive, uninspired Stalinesque style of the postwar period to the starkly modern styles that have become commonplace in many Western cities. The concrete is less formidable, and the use of color and glass is more liberal and



Drawn by Gesina B. Threlkeld

MAP OF DOWNTOWN LENINGRAD (Ленинград) TODAY SHOWING
IMPORTANT LANDMARKS AND HISTORIC PLACES

Key to Map of Downtown Leningrad

1. Pharmaceutical Island (*Aptekarsky Ostrov* — Аптекарский Остров), where the Komarov Botanical Institute of the Academy of Sciences of the USSR (Ботанический Институт им. В. Л. Комарова АН СССР) is located (east end).
2. Peter and Paul Fortress (*Petropavlovskaya Krepost'* — Петропавловская Крепость).
3. Anchorage of cruiser *Aurora*.
4. Leningrad State University.
5. Buildings from north to south on point of land:
Karpinsky Geological Museum (*Geologicheskiy Muzey im. Karpinskogo* — Геологический Музей им. Карпинского).
Central Naval Museum (*Tsentral'niy Voenno-Morskoy Muzey* — Центральный Военно-Морской Музей).
Leningrad Zoological Museum (*Leningradskiy Zoologicheskiy Muzey* — Ленинградский Зоологический Музей).
Academy of Sciences of the USSR (*Akademia Nauk SSSR* — Академия Наук СССР).
6. Old Admiralty (*Admiralteystvo* — Адмиралтейство); Decembrist Square (*Dekabristaya Ploshchad'* — Декабристая Площадь) is located at west end.
7. Winter Palace (*Zimniy Dvorets* — Зимний Дворец), which today houses the State Hermitage (*Gosudarstvennyy Ermitazh* — Государственный Эрмитаж), the world-famous art museum. On the south side is the Palace Square (*Dvortsovaya Ploshchad'* — Дворцовая Площадь).
8. St. Isaac's Cathedral (*Isaakievskiy Sobor* — Исаакиевский Собор). Across the street is the Hotel *Astoria* (Астория).
9. Summer Palace and Garden of Peter the Great (*Letniy Dvorets i Letniy Sad Petra I* — Летний Дворец и Летний Сад Петра I).
10. *Smolny* (Смольный).
11. Moscow Station (*Moskovskiy Vokzal* — Московский Вокзал).
12. Highway leading south past Hotel Russia (*Gostinitsa Rossiya* — Гостиница Россия) to Leningrad International Airport, Pushkin (Пушкин), and Pavlovsk (Павловск).

flagrantly decorative. My hotel itself, *Gostinitsa Rossiya* ("Hotel Russia"), had only been built within the past 10 years, but it did not bear the touch of the newer architecture. Although my guide was quite proud of this hotel, calling it Leningrad's "modern" hotel, the modernity is a little obscure. The 19th-century *Astoria* in downtown Leningrad, though outdated, still has a touch of elegance and graciousness, and is the instant favorite of foreign visitors.

Transportation has come a long way since the time of Peter I, when the trip from Moscow to St. Petersburg took many days overland through virgin taiga, and connections to the outside world were provided only by sea. Today Moscow is an easy and comfortable overnight trip by train from Leningrad and a few hours away by plane. Leningrad has a large and expanding airport, where connections to all parts of the world can be made, usually via Moscow or Helsinki, although its air traffic is surprisingly light for a city of such size and prominence. A network of highways connects Leningrad with outlying towns and distant cities. The city is also connected by water to the White Sea on the north and the Volga River on the south by means of a series of rivers, lakes, and artificial canals. Public transportation in the city is very good, as in European cities generally, and includes buses, trolleys, and an 18-mile subway completed quite recently. A little pompous and motley architecturally, the subway is nonetheless a real showpiece and a major engineering achievement for an almost arctic city, sitting on a circumpolar line with northern Kamchatka and southernmost Greenland. The streets of Leningrad are relatively busy with cars and especially trucks, which greatly outnumber the cars. Apparently most of the vehicles are publicly owned, but taxis for hire are all too scarce.

Leningrad is a spacious city of broad avenues (*prospects*), wide open squares, panoramic waterfronts, and quiet ram-

bling parks and monument grounds. It is very beautiful but outwardly seems subdued and almost drab to the foreigner who is accustomed to great glass fronts, thickets of gaudy signs, and shops with wares overflowing onto the sidewalks. Inconspicuous signs inform but seldom advertise; posters either announce some cultural attraction or extol the virtues of communist society. Few wares are attractively displayed toward the street for the window shopper. At night the city is especially disappointing to the visitor from abroad because the streets appear to him to be dimly lit and lack the neon gaiety of comparable foreign cities. Yet the real beauty of Leningrad lies behind the sometimes monotonous façade of her buildings. It is the beauty of her historic places and fabulous historical treasures, her scientific and cultural institutions, and her warmly hospitable people, whose indomitable spirit has sustained a great city for more than two centuries.

Leningrad is above all a city of history. Few Russian cities have more to tell and few can evoke a more vivid sense of the past. St. Petersburg belonged to the tsars, and in a way so does the modern city; on every hand one can see the palaces, cathedrals, state buildings, and monuments they built so that Leningrad almost seems like a colossal temple to the tsars. The Russian people have gone to great expense and effort to preserve and restore the imperial dwellings of St. Petersburg as public museums. During World War II Hitler's army leveled all the summer palaces of the tsars outside the city, and the Russians are still busy with the staggering task of authentic restoration.

Today, the visitor to Leningrad can tour the preserved and restored tsarist buildings, see firsthand the elegant interiors and lavish furnishings, and gain some notion of the opulent lives led there. In the Hermitage, the former Winter Palace and most famous tsarist museum of Leningrad, and in St. Isaac's

Cathedral—to cite two outstanding examples—one finds oneself speechless at the sight of the ornate gold overlays, intricately inlaid floors, paneled walls, frescoed ceilings, enormous columns of precious stones, and numerous priceless paintings and sculptures. Not until after the Revolution did the Russian peasants of St. Petersburg ever glimpse the treasures of the Winter Palace, and it was not until then, too, that they first learned that the Palace contained a hanging garden within its compound for the relaxation and pleasure of the Imperial Court. Going from one historical museum or monument to another, one becomes immersed vicariously in the almost timeless history of the Russian people.

At first thought the devotion of the Soviet Government to preserving or even restoring tsarist history seems ironic, but of course this zeal has not always been so pronounced. The present generation have largely been born during the Soviet period, and they have a genuine appreciation and fascination for their rich heritage. Fortunately for the benefit not only of the Russian people but for people everywhere, the Government has seen fit to preserve this heritage. Today's citizens of Leningrad have a great pride in their historical museums, and one senses that they feel indebted to the tsars for this rich legacy.

The average resident of the city seems to take an objective and quite detached view of his tsarist surroundings. As though it were "thumbing its nose" at the tsars, the State has converted beautiful cathedrals into antireligious, materialistic museums, and has developed a public beach along the Neva River in front of the infamous "Peter and Paul Fortress," the dreaded torture prison of St. Petersburg during tsarist times, where such historic Russians as Dostoevsky were imprisoned for political crimes. *Intourist*, the Soviet travel bureau, exploits Leningrad's tsarist legacy to the full in the



Mountains at *Petrodvorets*, summer palace of tsars along Gulf of Finland west of Leningrad



Apartment construction on south side of Leningrad behind Hotel Russia, 1964. Below, Gateway to Palace Square opposite the Winter Palace in heart of Leningrad.

photographs by S. G. Shetler





Looking across the Neva River at the spire and walls of Peter-and-Paul Fortress behind public beach.



Looking across the Big Neva at the museum buildings and Leningrad headquarters of the Academy of Sciences of the USSR in Pushkin Square on the point that divides the Neva. In the distance, the spire of Peter-and-Paul Fortress.



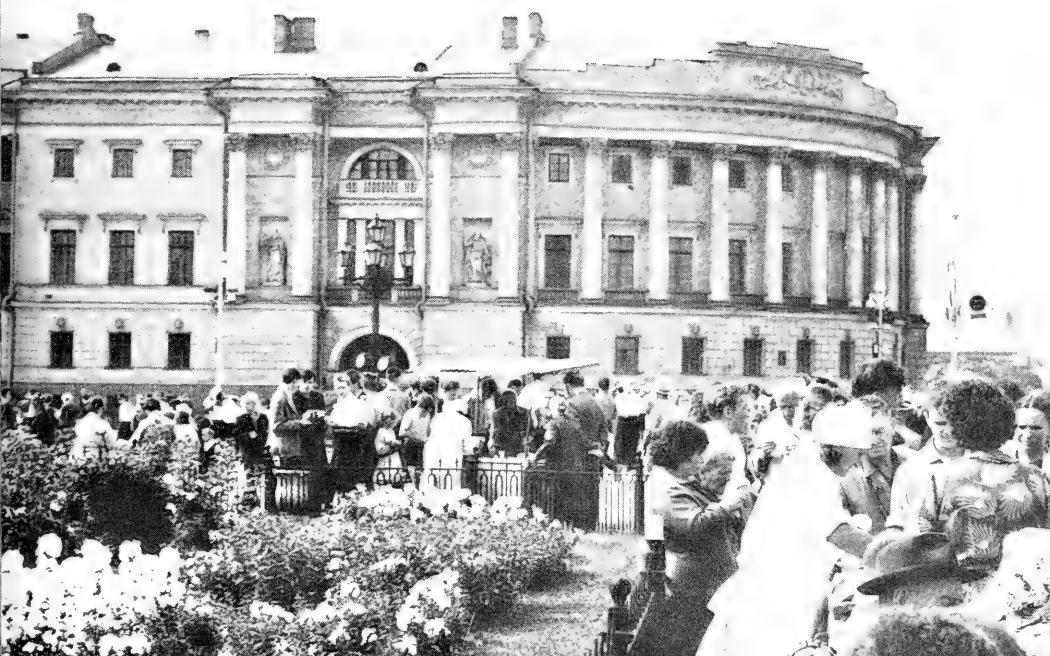
Photographs by S. G. Shetler

Leningrad State University on the banks of the Big Neva.



St. Isaac's Cathedral in center of Leningrad. *Below*, Selling ice cream near waterfront to crowds celebrating Soviet Fleet Day.

Photographs by S. G. Shetler





Left, Smolny, Lenin's revolutionary headquarters in 1917. Below, Downtown Leningrad. On the right: Hotel Astoria; in the background: spire of the Admiralty.

Photographs by S. G. Shetler



foreign tourist trade, and their guides are well informed about Russian history and culture. Thousands of Russian people also pour through the museums and take serious interest in them. To be sure, the museums have an instructional function beyond the mere telling of history—presumably, the people are chastened by what they see. Indeed, it is impossible to come out of these museums without being a little chastened and more than a little impressed with the enormous gulf that separated the opulent royalty from the masses of destitute Russian peasants. Yet one also emerges with that pleasant thrill of having been “tsar for a day.” To be able to retreat for a few hours or days into the vicarious world of the tsars is obviously a real pleasure that can be enjoyed by all the people.

Leningrad has known great tragedy; across its face are the scars of centuries of tyranny and war, poverty and starvation. Scattered throughout the city are the parks, squares, and monuments that commemorate the grim events of World War II when the 900-day Nazi blockade starved to death more than a half-million residents of Leningrad and all but strangled the city. So confident of victory was Hitler that he ordered menus and programs printed for the victory celebration, which was to have been held in downtown Hotel *Astoria*. He planned to attend in person. Captured by the Russians when they finally won the desperate struggle and broke the siege, these artifacts of Hitler’s inhuman if meticulous calculations are now displayed in the *Astoria*. Contemplating the dogged endurance of the Russian resistance in Leningrad during those 3 desperate years of the blockade, and considering the extensive rebuilding and modest prosperity of the city today, one is deeply impressed with the image of a heroic and resilient people.

Present-day Leningrad is a city of many contrasts and paradoxes. Some are common to large cities the world over,

while others are unique to the Soviet Union or simply to Leningrad. The unique features are due in part to the rather different values of Soviet society but mainly to the character of the Soviet economy. The city has a modern subway system, and hydroplanes speed up and down the Neva River between a downtown wharf and the country summer palace on the Gulf of Finland known as *Petrodvorets* ("Peter's Palace"), but citizens must queue and tussle, literally, for a cab ride. Teenagers roam the parks with transistor radios, but one can watch the grass being cut in front of Leningrad's newest hotel with a scythe. Culturally, the city offers only the finest in ballet, opera, music, and theater, but it is hard to find an intimate "pub" where one can converse quietly over a sandwich and a beer. Restaurant service can be incredibly slow; even my guide could not understand why it took me 2 hours to be served a bowl of *borsch moscovsky*.

All the paradoxes notwithstanding, one finds Leningrad to be a beautiful and charming city and its citizens a warmly hospitable people.

PART 2

The History

Introduction

*J*n its present structure the Komarov Botanical Institute dates from 1931 when the Principal Botanic³ Garden of the USSR and the Botanical Museum of the Academy of Sciences of the USSR, both in Leningrad, were merged into a single institution within the framework of the Soviet Academy of Sciences. The Botanical Museum had always been a unit of the Academy, while the Botanic Garden had been elevated only the previous year (1930) from Principal Botanic Garden of the Russian Republic (RSFSR⁴) to the status of a member institution of the Academy. In 1940, the Botanical Institute was named in honor of Academician V. L. Komarov, instigator and editor-in-chief of the monumental *Flora SSSR* ("Flora of the USSR"), who was at the time president of the Soviet Academy of Sciences. He died in 1945, and in 1946 annual "Komarov Readings" in his memory were inaugurated at the Botanical Institute by the Presidium of the Academy of Sciences.

The Imperial Botanic Garden and the Botanical Museum of the Academy of Sciences were founded independently in

³The Russian adjective *ботанический* (*botanicheskiy*, hereafter simplified to *botanichesky*) can be translated either "botanic" or "botanical." I have followed the translation practices of the Russians themselves and translated it "botanic" in connection with the Garden and "botanical" in connection with the Museum and Institute.

⁴Where necessary for clarity, transliterated words and abbreviations are rendered in *italics* in this book, as with foreign words generally, but translated words and abbreviations are placed inside quotation marks. Neither *italics* nor quotation marks are used for words that have become common in English usage, e.g., ruble.

the early 19th century, but their forerunners took origin about 1714, as already indicated. Thus, the *real* origin of the present-day Botanical Institute must be traced to this earlier date—over 250 years ago. The time was finally ripe in 1931 to unite these two institutions which for about 100 years had had quite similar objectives and many overlapping functions. The union was effected to eliminate the previous duplication and consequent waste of effort and resources.

CHAPTER

3

Imperial Botanic Garden of St. Petersburg [1714] 1823 - 1931

Peter I (1672–1725), originally established the Botanic Garden as the so-called *Aptekarsky Ogorod*, meaning “Pharmaceutical Garden.” The precise year of founding, whether 1713 or 1714, has been disputed, but the actual decree was dated February 11, 1714 (2,3). The Garden was founded on a large island in the Neva Delta which became known as *Aptekarsky Ostrov* (“Pharmaceutical Island”). The present-day Botanical Institute is still located on this site, which in 1714 was in the remote outskirts of St. Petersburg but today is near the center of Leningrad. The Garden was organized as a subordinate unit of the State Apothecary, under the Medical Office, chiefly for the purpose of supplying medicinal plants and products to Peter’s army. All early records have been burned, and little more of those first days is known than that the Garden was small and had both indoor and outdoor plantings.

During the 18th century the Garden passed from one jurisdiction to another and changed names accordingly. In

1725, when Peter I died and his wife, Catherine I, became empress, it was renamed the “Garden of Her Imperial Majesty Catherine I” and placed under some degree of supervision of the Imperial Court. The Russian word *Sad* was substituted for the word *Ogorod*⁵ in the official name, and this was a change of some significance, indicating that the Garden had taken on a more general character and now included more than purely medicinal plants. The word *Sad* was not consistently used in the Garden’s name thereafter, however. Again in 1735 the name was changed, this time to *Meditzinsky Sad* (*M. Ogorod* in some accounts [3]), but despite the name “Medicinal” the Garden was not entirely devoted to medicinal plants.

About this time the first publication of the Garden was issued. It was a privately published catalog (see p. 36) of the plants under cultivation at the Garden, indoors and outdoors, compiled by Director J. G. Siegesbeck (1686–1755), in which 1275 species were enumerated—*Primitiae Florae Petropolitanae* (1736). Many of these plants had been brought from Siberia, Mongolia, China, and other distant countries.

Russian scientists were scarce, and Peter I invited foreign (mainly German) scientists to develop the medical and pharmaceutical sciences at the *Aptekarsky Ogorod*. Not until the late 18th century did Russian botanists begin to replace the foreigners.

For many years the foreigners secured a prevalent position in the ‘Aptekarsky Ogorod,’ as they did in fact in all the other scientific institutions, and obstructed the access of Russian specialists to these institutions. This characteristic feature of the history of the ‘Aptekarsky Ogorod’ and of the history of the Botanic Garden at its early stages has been obscured by some of its historians, even by V. I. Lipsky. (2, p. 5)

⁵The word *огород* (*ogorod*) means literally “vegetable” or “truck” garden, referring to a special kind of useful plant garden, while *сад* (*sad*) is the general word for “garden” and is much more applicable in the context of botanic gardens. This is particularly true from the standpoint of modern Russian.

Siegesbeck⁶ directed the Garden for 7 years (1735–42) and then left to become an academician in the Academy of Sciences and to occupy the chair of botany. From 1742 until 1765, when the Swedish botanist Johann Falk (1730–74), a student of Linnaeus, became director, the Garden was without the leadership of a scientist, and by 1765 it hardly resembled the Garden that Siegesbeck had left. In particular, few of the Siberian plant collections had survived. Despite high scientific qualifications, Falk did not manage the Garden well. In 1768 he departed on a long expedition, which he did not survive, dying in 1774.

After Falk's departure, the Garden was placed for the first time under the directorship of a Russian botanist. He was Martin Terechowsky (1740–96), one of the first botanists and microbiologists in Russia. During his directorship he went abroad for several years (1772–75) to prepare a dissertation at Strasbourg. In 1793 he compiled the second catalog of the species under cultivation in the Garden (*Catalogus Plantarum Horti Imperialis Medici Botanici Petropolitani in Insula Apothecaria*; 1406 spp.). It was published in 1796, the year he died. The catalogs of Siegesbeck and Terechowsky were the only two works concerning the Garden published during the first 100 years of its existence.

Terechowsky was succeeded after his death by Prof. G. F. Sobolewsky (1741–1807), and in 1798 during the latter's directorship the "Medicinal Garden" became the "Medico-Botanic Garden" of the "Academy of Medicine and Surgery"

⁶It was during his tenure as director, in 1737, that Siegesbeck made his famous, scathing attack on Linnaeus' Sexual System of Classification. "He is remembered today only through the unpleasant small-flowered weed which Linnaeus named *Sigesbeckia* [Compositae]" (Stearn, William Thomas. 1957. An introduction to the *Species Plantarum* and cognate botanical works of Carl Linnaeus, p. 25. In Carl Linnaeus Species Plantarum, a facsimile of the first edition, 1753, vol. 1. London, Adlard and Son, xiv, 176 and 560 pp.).

(now the “Kirov Academy of Military Medicine”), where students of the Academy studied botany. Sobolewsky was sick during much of his tenure and, consequently, Prof. T. A. Smelowsky (1769–1815) of the Academy played a large role in the direction of the Garden. Smelowsky’s contributions included the translating of Linnaeus’ *Philosophia Botanica* into the Russian language. After Sobolewsky, the Garden was directed for a time (1806–09) by F. H. Stephan (1757–1814) and finally (1809–13)⁷ by Prof. Jason V. Petrov; despite their considerable and experienced efforts, however, it continued to deteriorate.

In 1823, the Medico-Botanic Garden was reorganized and designated the “Imperial Botanic Garden of Saint Petersburg” (see footnote on p. 40). The eminent botanist F. E. L. Fischer (1782–1854)⁷ now became its director. This brought to an end the Garden’s subordination to the Academy of Medicine and Surgery. The initial stimulus for reorganization came from a report submitted to the Tsarist Government in 1823 by the Minister of Home Affairs, V. P. Kotschubey, pointing out the deplorable condition of the Garden—ramshackle greenhouses, etc.—and emphasizing the urgency of putting it on a regularly financed basis so that it could become a research institution worthy of a great country like Russia. This report was favorably received and was reinforced by a second event that occurred about the same time.

A year earlier (1822) Count Razumovsky died. His death brought the closing and gradual dissolution of his renowned private botanic garden and library, started in 1795 at Gorenky near Moscow. Fischer had been the Count’s chief botanist. In a move to salvage what by now was recognized as a great national treasure, the Government eventually (by 1825), despite great transportation difficulties, transferred the rarest

⁷Known in the Russian language as F. B. Fischer.

plants in the Gorenky botanic garden and the Count's extremely valuable botanical library to St. Petersburg. This helped to introduce a whole new era into the life of the St. Petersburg Garden. The Gorenky books provided the nucleus for developing a library at the newly created Imperial Botanic Garden, and the year 1824 usually is given as the founding year of the library of today's Komarov Botanical Institute.

Under the aegis of Fischer and the distinguished directors who followed him, the Imperial Botanic Garden took on a scientific character. *Organized* development of the herbarium began about 1823, and this date generally is considered the founding date of the present herbarium in Leningrad, although technically it was founded in 1714.⁸ The Garden was not wholly freed from pharmaceutical responsibilities, however, and for a long time it continued to supply the State Apothecary. Official jurisdiction changed several times and with it the fortunes of the Garden. First, the Medical Department of the Ministry of Home Affairs controlled it (1823–30), then the Ministry of the Court (1830–63), and finally the Ministry of State Properties, which took over only after special representations by Director E. A. Regel (1815–92), who devoted 40 years of his life to the Garden, serving two non-consecutive terms as director. The Ministry of the Court had improved the material position of the Garden but had so interfered with its scientific development that at one point Regel personally organized a separate "Pomological Garden" on the side for plants which interested him scientifically.

The 19th century was a period of great expansion and growth at the Garden, making it the major botanical institution

⁸Vassilczenko (4) gives the date 1713 and credits Peter the Great with personally having collected the first herbarium, which for a long time was kept in Moscow until it perished in the conflagration of 1812. He notes that the oldest specimens in the Leningrad herbarium today date back to 1709. They were collected in the vicinity of Moscow by a physician of Peter I.

of Russia as well as a major international botanical center. Many expeditionary efforts were supported by the Garden, especially inside Russia but also throughout the world. Already by the 1870s, the herbarium had accumulated nearly 200,000 specimens, and the library had approximately 15,000 volumes. More than 21,000 species and varieties were under cultivation. Among the many extremely important collections that were added to the herbarium during the 1800s and early 1900s, those of K. F. Ledebour (1785–1851) (vouchers for his classic *Flora Rossica*), C. A. Meyer, Trautvetter, F. Fischer, Turczaninov, Schrenck, Maximowicz, Komarov, and B. A. and O. A. Fedtschenko are some of the most notable. At the beginning of the 20th century, the “Transmigration Bureau” sent expeditions into all parts of Asiatic Russia to study soils and vegetation, and during one 5-year period (1908–12) more than 100 collections added over 150,000 specimens to the herbarium. The work of this Bureau was responsible for a great new surge in floristic research. (2,5)

In the late 18th century and about the first half of the 19th century, the Russians were actively involved in discovery voyages to the Bering Sea and southern Alaskan regions. During this time various Russian settlements were established in Alaska from the Aleutian Islands to the southeastern Panhandle, where an especially well-known, semipermanent Russian-American colony was established at Sitka. Accompanying the navigators and explorers on many of the voyages were Russian naturalists or foreign naturalists under Russian employ, who sent back plant specimens to St. Petersburg, primarily to the Imperial Botanic Garden but also to the Botanical Museum of the Academy of Sciences. This was quite logical of course because at that time Alaska was Russian territory, and together the two institutions in St. Petersburg housed what was, in effect, the national herbarium of

Russia, where one would expect collections from Russian territory to be housed. Thus the history of botanical exploration in Alaska begins with the Russians, and a large majority of the early Alaskan collections and types are still preserved in Leningrad today. For this reason, the plant collections of those discovery voyages are particularly significant to North American botany. Lebedour's *Flora Rossica*, published in 1842-53, included not only all of Siberia and Russia but also Alaska, as it was then known. Rothrock's later "Sketch of the Flora of Alaska" (1868) was merely a compilation from Lebedour's work (6).

The first collections ever made in Alaska have been lost, but the historical records of them are preserved in Leningrad (6). These collections were made by the German botanist G. W. Steller (1709-46) who, as naturalist, accompanied the Danish Captain Vitus Bering on board the vessel *St. Peter* in 1741, when Alaska was discovered. It was the "Second Kamtchatka Expedition," and the other ship, *St. Paul*, was under the command of the Russian Captain Chirikoff. Its naturalist was named Croyère. The collections of both Steller and Croyère were destined for St. Petersburg eventually, but various events caused their complete loss enroute. The next Russian involvement did not come until more than a half-century later, although only a handful of collectors under other flags reached Alaska in the meantime. In 1805 and 1806, Academician G. H. Langsdorff (1774-1852),¹⁹ Russian Consul-General in Rio de Janeiro, accompanied Captain Krusenstern on his circumnavigation of the globe, which brought them eventually to all parts along the southern Alaskan coast from the Aleutian Islands and Kodiak to Sitka in the Southeast. Langsdorff sent his collections back to the Botanic Garden in St. Peters-

¹⁹G. I. Langsdorff in the Russian language.

burg. The next to figure in Alaskan exploration were Chamisso and Eschscholtz who accompanied Captain Kotzebue around the world in 1816–17 and made extensive collections on Unalaska, the Pribilof Islands, and at other Alaskan localities in the Bering region. Their collections were sent to Berlin and St. Petersburg, where they came to reside in the Botanical Museum of the Academy of Sciences.

Russia's interests in Alaska were sold to the United States in 1867, but the Russian phase of scientific exploration had essentially ended by mid-century. Probably the last major collection to go to St. Petersburg was that of Heinrich Tiling, a physician in the Russian-American colony at Sitka. His collections were made on Unalaska in 1851 and around Sitka from 1866 to 1868. Prior to 1850, however, a whole series of Alaskan collectors besides those already mentioned sent their specimens to St. Petersburg, either to the Garden or the Museum. By date of exploration, they were: Kyber (1825), Kusmischeff (ca. 1825), Chlebnikoff (1827), Kastalsky (1827), Mertens (1827), Postels (1827), Peters (1829), Blaschke (1830–42), Wrangell (1834), and Wossnesensky (1840–49). During this entire period (1825–49), only two collections are recorded from Alaska—Wormskjold, Lay and Collier—which did not ultimately get deposited in St. Petersburg. Of those collections that did reach Petersburg, Mertens' collection (1827) from Sitka is especially noteworthy, because it became the basis for one of the earliest publications on Alaskan plants—Bongard's *Observations sur la Végétation de l'Ile de Sitcha* (Mém. Acad. Sc. St.-Pétersb. VI, 2. 1833). After 1867, a period of intensive American exploration of Alaska began. (6)

Another noteworthy international collecting effort of the Imperial Botanic Garden in the early 1800s also was spearheaded by Consul-General Langsdorff. Assisted by the botanist

Ludwig Riedel (1790–1861) and the gardener Bernhard Luschnat, he organized a remarkable program to send back live plants and other collections to Petersburg from the rich flora of Brazil. During the years 1821–34, Langsdorff and Riedel traveled widely around Brazil, collecting and studying the flora. Most of this time (1821–28) was spent in the Amazon Basin. Between about 1831 and 1835,¹⁰ Riedel and Luschnat operated what was in effect a little Rio de Janeiro “branch” of the Petersburg Garden, organized expressly for sending back live plants and other botanical materials to Russia on a regular basis. Altogether, this team—Langsdorff, Riedel, and Luschnat—was responsible for sending back several thousand pots of live plants, about 100,000 herbarium specimens, comprising about 10,000 species, and numerous wood, fruit, and seed collections. It is especially interesting that these collections from Brazil were the first tropical collections to be added to the herbarium at St. Petersburg in pre-Revolutionary time; the first tropical collections to be added in post-Revolutionary time were also made in Brazil. Furthermore, some of the first tropical collections to be made by Soviet botanists after World War II (1947) came from Brazil (p. 104). Thus, Russian botanists have had a longtime interest in the plants of Brazil. (2, 4, 7, 8 [cf. Bobrov, p. 42, and Sokolov, p. 218])

To accommodate tropical and subtropical plants at the St. Petersburg Garden, a greenhouse-building program already had been launched by Director Fischer in 1823. By the end of the 19th century, the Garden had some of the most celebrated conservatories in Europe. The palm and *Victoria amazonica* conservatories, completed in 1899, were extremely large and became widely known outside Russia.

By the time of the Bolshevik Revolution in 1917, the

¹⁰These dates are variously given as 1831 or 1832 to 1835 or 1836.

Botanic Garden had become a virtual botanical academy covering nearly all phases of plant science and including a public exhibit museum, founded in the same year that the Imperial Botanic Garden was organized (1823). This museum was dedicated to illustrating the importance of plants to man. It is to be distinguished from the Botanical Museum of the Academy of Sciences. By now the herbarium had nearly 2 million specimens and the library over 40,000 volumes. The Department of Living Plants, directed by V. I. Lipsky, was maintaining about 26,000¹¹ species and varieties inside 28 greenhouses and another 5000 species in the outdoor plantings of the arboretum and park spread over 15 hectares (about 37.5 acres) on Aptekarsky Island. Altogether, there were 10 scientific departments and a total staff of 148, including 30 professional botanists. Among them were some very notable botanists of the time: V. A. Dubjansky, B. A. Fedtschenko, A. F. Flerow, V. L. Komarov, V. I. Lipsky, I. V. Palibin, R. U. Roshevitz, and A. S. Bondarzhev, who is still active, to name a few (2, 3). For all its activity and international importance, however, the Imperial Botanic Garden had its problems during pre-Revolutionary time:

... the Botanic Garden, like the majority of research institutions of tsarist Russia, was restricted in its development by the scarcity of finance, by the absence of planning of research work, by the shortage of scientific workers and staff employed, by still insufficient contact of the research work as a whole with the everyday requirements of Agriculture and Industry. The bureaucratic element which was very strong in the administration of the Garden suffocated every animated undertaking, especially in research work, and hampered the progressive development of the Garden. (2, p. 11)

The coming of the Revolution brought a sharp disruption in the activities of the Garden and the closing of a long and

¹¹Avrorin (7) gives the total figure of 28,000, which he compares to the present assemblage of 25,000 species and varieties in the Royal Botanic Gardens at Kew (England).



From Baranov and Bobrov (8)

Ф. Б. Фишер
Friedrich E. L. Fischer (1782-1854),
first director of Botanic Garden, 1823-50.



Э. А. Регель
Eduard A. Regel (1815-92),
director of Botanic Garden
1855-66, 1875-92.

Courtesy Komarov Botanical Institute

om Baranov and Bobrov (8)



Борис Л. Исаченко
Boris L. Isatchenko (1871-
1948), director of Botanic
Garden 1917-30.

rather illustrious scientific era. A. A. Fischer von Waldeim (1839–1918) was director at the time, and, in keeping with the general aims of the Revolution, he was immediately replaced in 1917 by a Russian botanist, Academician B. L. Isatchenko (1871–1948), the first “elected” director. Concerning the immediate period that followed, Lebedev *et al.* write (2, p. 12):

During the first difficult years suffered by the young Soviet Republic, the years of devastation, lack of fuel, interruptions in the supply of electric energy and water, disrepair of sewerage, the decline of printing, etc., special attention was devoted to the rescue and preservation of the valuable scientific collections of the Botanic Garden, the great national treasure.

Fewer greenhouses were maintained in working order, and many live plant collections perished; some of the Garden's departments ceased to function; visitor attendance to the greenhouses and park dropped from about 80,000 annually, just prior to 1917, to less than 2000 in 1918. It was not until 1922 that normal activity was more or less restored, and new growth and activities began. For example, a new Department of Geobotany was founded in that year, and by 1923 the number of visitors was nearly 30,000.

A change in fortunes was signaled in 1921, after the Revolution, when the Botanic Garden in Petrograd, as the city was now called, was made a subordinate unit of the “People's Commissariat of Agriculture of the Russian Republic of the USSR” (see footnotes on pp. 4 and 40). This was done to recognize the stature of the Garden as a “research and instructive-educative institution of world-wide scientific significance, embracing all branches of theoretical and applied botany” (2, p. 13). In 1925, the Garden was given increased status when it was assigned “All-Union” importance, thus becoming a national rather than provincial institution.

Once the Garden was "back on its feet" it was charged with many new research tasks, covering the full range of botanical inquiry. Special emphasis was placed on floristic, geobotanic, and phytogeographic studies, including vegetation mapping, which were directed toward the surveying of plant resources in the USSR and adjacent countries. A chief object of this large-scale survey was to find plants suitable for introduction and utilization in agriculture and commerce. A much more practical orientation suddenly prevailed than in immediate pre-Revolutionary times, and there followed at the Garden, as throughout the Soviet Union generally, a long period of domestically focussed botanical activity, concentrated on the Russian flora and its uses. Only since World War II have Russian botanists turned significant attention to the study of plants beyond the borders of the USSR.

During the 18th century the Garden had no publication means of its own, and the contributions of its early scientists, such as the several floras of Sobolewsky (*Flora Petropolitana*, 1799; *Sanktpeterburgskaya Flora* . . . , 1801–02), describing the native and introduced flora of the Petersburg district, were published privately. The same was true of the Siegesbeck and Terechowsky catalogs, the former having been printed in Riga.

Publication activities of the Garden increased enormously during the 19th century especially toward the end. In 1835 the Garden began to publish what was in effect its first serial, *Index Seminum quae Hortus Botanicus Imperialis Petropolitanus pro Mutua Communicatione Offert*, compiled by Fischer and Meyer. It was not merely a seed list because it carried a supplement (*Accendit Animadversiones Botanicae Nonnullae*) in which descriptions of new genera and species, critical notes on systematics, and other short taxonomic papers appeared.

In fact, *Index Seminum* constituted the first taxonomic journal of the Garden.

This catalog appeared annually with supplement until 1846 and again from 1855 to 1869. Between 1846 and 1855 only two issues appeared but under a different name (*Semina Delecta, Collectione Anni 1852 [1853], quae Hortus . . .*), which, however, included the supplement. In 1870, the name was changed from *Index Seminum* to *Delectus Seminum*, and the supplement was dropped, stripping the annual catalog of its taxonomic features and making it a simple seed exchange list. Except for short breaks during the Revolution (1918–19) and World War II (1942–45), *Delectus Seminum* has appeared annually up to the present time, although undergoing several name changes corresponding to changes in the name of the institution. The early issues of this serial are extremely rare today, and no library in the world, including the library of the Komarov Botanical Institute, has a complete set. (2, Lebedev in 8)

The first fascicle of *Acta Horti Petropolitani* appeared in 1871. It included E. R. Trautvetter's "Short Outline of the History of the Imperial Garden of St. Petersburg," which was reprinted later as a separate book. With the founding of this periodical, the Garden now had its own outlet for floras, monographs, and other large botanical works, hitherto of necessity published in outside journals, e.g., in the "Bulletin of the Moscow Society of Naturalists," as well as a formal outlet for shorter taxonomic papers. Previously, these short papers had gone into the supplement of *Index Seminum*, discontinued with the beginning of *Delectus Seminum* (1870). At first the primary language of *Acta* was Latin, but in the 1890s Russian became the only language of publication. Under variously modified names, corresponding to changes

in the name of the Garden, *Acta*—or *Trudy* (“Proceedings . . .”), as the journal has always been known for short in Russian—has been published continuously from 1871 down to the present time, although it underwent major reorganization and expansion in 1932 after the Botanical Institute was formed. Bibliographically, therefore, *Acta Horti Petropolitani* is considered to have terminated in 1932. Through the years the large majority of papers dealt with the systematics and geography of plants, and some of the Garden’s most outstanding contributions appeared in this periodical.

A second scientific journal was started in 1901 in response to the growing need for a quick means of publication for shorter papers, including critical literature reviews, “polemical” notes, and news items about the activities of the Garden. It was called the *Bulletin du Jardin Imperial Botanique de St.-Pétersbourg* (also had a Russian title) at first, but, as with other periodicals, underwent a number of name changes subsequently (1914, 1918, 1932). The *Bulletin* differed from *Acta* in not being limited to systematics and geography; papers on all phases of botany were included.

In 1902 the “Bulletin of Plant Disease Control” first appeared, which later (1907) was called *Morbi Plantarum* and in 1912 the “Annals of the Experiment Station for Seed-Testing” began.

Perhaps the periodical best known today to taxonomic botanists around the world is *Notulae Systematicae ex Herbario Instituti Botanici Nomine V. L. Komarovii Academiae Scientiarum URSS*, which first appeared in 1919 under the Botanic Garden’s name of that time and under the editorship of B. A. Fedtschenko. It was initiated to provide the botanists in the herbarium with their own publication outlet for revisions, nomenclatural notes, and descriptions of new species. Up to this time, the herbarium had not had its

own publication, and contributions from the herbarium had been published either in the *Acta* or the *Bulletin*. Sometimes this was a very slow means of publication, and the herbarium needed a quicker outlet. A cryptogamic series was added to the *Notulae* in 1922. Both series have continued to appear up to the present time, although undergoing reorganization and name changes in 1964 (see p. 167).

Although the Garden had by 1917 already branched into seed-testing, plant introduction, pathology, horticulture, physiology, morphology, and anatomy, its strongest research efforts continued to be in taxonomy and geobotany; its most important contributions during the premerger period were made in these areas in the form of monographs, revisions, floras, and vegetation studies, including maps. After the Revolution, the herbarium was organized into the following sections: (1) General, (2) Middle and Eastern Asia, (3) European Russia and Crimea, (4) Caucasus, (5) Turkestan, (6) Siberia, (7) Far East, (8) Petrograd Flora, and (9) Reference. It will be seen that these divisions were similar although not identical to those existing in the Botanical Museum at this time (see footnote 21, p. 54).

From about 1922 on, expeditionary activity picked up rapidly, following the interruption caused by the civil war, and collecting trips were taken to all parts of the USSR. Among the many who made important collections for the Garden's herbarium over the succeeding years, the following persons should be mentioned: E. G. Bobrov and others (Bashkiria), V. I. Smirnov (European Russia), N. M. Savicz (Kola Peninsula), B. A. Fedtschenko (Central Asia), M. M. Iljin (Astrakhan), V. I. Lipsky (Caucasus), A. A. Dzevanovsky (Caucasus and Crimea), O. A. Enden (Kazakhstan), N. V. Shipchinsky (Kazakhstan), V. N. Sukaczev and G. I. Poplavskaya (Baikal region), and V. L. Komarov (Kamtchatka and Far East).

These extensive collecting activities culminated in a large number of taxonomic papers and quite a few important books and monographs. Noteworthy here was the cooperative effort of the staff in publishing the 6-volume "Flora of the Southeast European Part of the USSR," started in 1927 and completed in 1936 after the merger. Also, Komarov's 3-volume "Flora of Kamtchatka" (1927-30) deserves special mention, although it did not approach the same critical taxonomic level and consequently never has held the same significance in the literature of this region as the classic "Flora of Kamtchatka and Adjacent Islands," published by Eric Hultén at about the same time (1926-30).

After the merger in 1931, the botanists at the Garden continued to carry on some of the expeditionary and research activities that were in progress, as already indicated, but the founding of the Institute also gave birth to a whole new cycle of projects, which then consumed the joint efforts of most of the former Garden and Museum staffs.

As of 1931 the Imperial Botanic Garden, by now called the "Principal Botanic Garden of the USSR,"¹² had been in existence as an independent institution for 108 years (1823-1931) since reorganization, and during this time it had had the following succession of directors (years of leadership given in parentheses): F. Fischer (1823-50), C. A. Meyer (1850-

¹²1823-1917 — Imperial Botanic Garden or Botanic Garden of St. Petersburg (Petrograd, after 1914; see footnote 2, p. 4); renamed "Imperial Botanic Garden in the name of Peter the Great" at the 200th anniversary jubilee in 1913.

1917-1918 — Principal Botanic Garden of Petrograd. There is some question whether the second date is 1918 or 1921; see next item.

1918-1925 — Principal Botanic Garden of the Russian Republic of the USSR (RSFSR); subordinated to "People's Commissariat of Agriculture" of the Russian Republic in 1921.

1925-1931 — Principal Botanic Garden of the USSR; transferred to the jurisdiction of the Soviet Academy of Sciences in 1930.

55), E. A. Regel (1855–66), E. R. Trautvetter (1866–75), E. A. Regel (1875–92, second term), A. F. Batalin (1892–96), A. A. Fischer von Waldheim (1896–1917), and B. L. Isatchenko (1917–30). Many other distinguished botanists had worked in the Garden during all these years besides the directors and others already mentioned or discussed.

CHAPTER

4

Botanical Museum of the Academy of Sciences [1714] 1835-1931

The Botanical Museum was an outgrowth of the botanical collections in the old *Kunstkammer* established by Peter I in St. Petersburg about 1714. The *Kunstkammer* was a general museum of sorts—a gallery or “cabinet” of arts and curios, which soon was affiliated with the Imperial Academy of Sciences founded in St. Petersburg in 1725. Thus, the origins of the Botanical Museum go back to about the same time, 1714, as the origins of the Imperial Botanic Garden.

After languishing for many years in a *Kunstkammer* attic with no care and no one to study them, the botanical collections were finally given appropriate attention and space in 1823 when the botanist C. B. Trinius (1778-1844) was invited to join the staff of the *Kunstkammer*. He found the collections in a deplorable state—completely disorganized and badly insect-damaged—although there were some extremely valuable old specimens among them; he began at once to sal-

vage what he could. These collections came from various expeditions organized by the Academy in the 18th and early 19th centuries for the scientific exploration of Russia and adjacent countries and included such important specimens as those of J. G. Gmelin (Siberia), G. W. Steller (Siberia), and S. G. Gmelin and J. A. Güldenstädt (Caucasus). As the Academy's museum, the *Kunstkammer* served as the repository for all scientific and historical objects collected in the name of the Academy. Bobrov (*in 8*, p. 72) suggests that the sad state of the botanical collections at the *Kunstkammer* may have been the reason the celebrated Pallas did not leave the bulk of his Russian plants to the Academy of Sciences but sold them abroad.

P. S. Pallas (1741–1811) was one of the real founders of botanical research in Russia. He worked at the Academy of Sciences in St. Petersburg. During his younger years he tramped all over Russia, and in his later years as a senior academician devoted his talents to writing about the flora of his adopted land. He was a natural historian who wrote not only about plants but about animals and other things. His *Flora Rossica*, written in Latin, was the first attempt that had ever been made to prepare a manual on the plants of Russia. It was never completed; volume 1, parts 1 and 2, were published in 1784 and 1788, respectively; part 1 of the second volume was published posthumously in 1815. The first part was soon (1786) translated into Russian by a Russian naturalist, V. F. Zuyev. Only fragmentary collections of Pallas are preserved in Leningrad today (4). (Baranov *in 8*, p. 21)

Trinius was really the first curator of botany at the *Kunstkammer*. Even though there had been someone in the museum who took at least a passing interest in botany as recently as 1809, all through the 1700s virtually nothing had been done to study and publish on the accumulating collections, and Trinius set about at once to organize scientific investigations of

them. He himself took up a study of the grass collections perhaps because of their superior preservation, and these studies soon brought him worldwide fame as an authority on the taxonomy of the family Gramineae. At his pleading the Academy convened a special conference shortly after his arrival at the *Kunstkammer* in 1823 to consider the fate of its botanical collections, and the conference authorized the establishment of a special Botanical Museum within the *Kunstkammer*. Subsequently, Trinius began to build a regular herbarium. As a first order of business he had herbarium cabinets built, obtained paper for mounting the loose specimens, and organized the salvaged collections so that they would be available for study. He began an aggressive program of acquiring new collections. In 1826, the Academy bought the Gorenky herbarium of Razumovsky which included upward to 10,000 species; in 1827 the collection of Moscow professor G. F. Hoffmann (1760–1826) was acquired; and in 1828 the outstanding collection of F. A. Marschall von Bieberstein (1768–1826), including the vouchers for his classic *Flora Taurico-Caucasica*, (1808, 1819), came to the Academy's herbarium. This 3-volume publication was the first substantive work on the flora of the Crimean-Caucasian region; previously, only scattered notes and articles had been published. Bieberstein's herbarium¹³ was preserved for more than a hundred years in an unavailable condition, and only recently has it been curated and made accessible to botanical scholars.

The plant collections were moved in 1835 from the old *Kunstkammer* quarters to a new building occupied until 1931. At this time the Botanical Museum was formally established as a separate institution, physically and administratively, within the Academy's structure. Trinius was named

¹³Смольянинова, Л. А. 1965. Гербарий Маршалла Биберштейна. Бот. журн. 50: 564–565. (Smoljaninova, L. A. *Gerbariy Marshalla Bibershteyna* ["The herbarium of Marschall Bieberstein"]. Bot. Zhurn.).

its first director, a post that he held until the end of his life in 1844. It is problematical whether to regard 1823 or 1835 as the formal founding date of the Botanical Museum because each was a milestone year in the revitalizing of the Academy's botanical section and in the development of an independent botanical museum. Official chronologies usually designate 1835 as the founding date and the beginning of Trinius' directorship, but at least one historian of the Museum (Bobrov *in 8*, p. 73) would place the founding in 1823.

The beginning of the revitalization of botany at the Academy coincided with Fischer's arrival in St. Petersburg to head up the newly organized Imperial Botanic Garden on Aptekarsky Island. Undoubtedly, the simultaneous awakenings at the *Kunstkammer* and *Aptekarsky Ogorod* were mutually reinforcing and both related to the cessation of activities at the Gorenky botanic garden of Razumovsky in Moscow.

The Botanical Museum had a very small scientific staff and a limited, if aggressive, research program during the years that followed; it was really not until after the turn of the century that the staff and program expanded significantly. Prior to 1900, the scientific staff consisted of the director and one other botanist who was called curator. A. H. G. Bongard (1786–1839) was curator in 1835 when the move was made, and he was occupied during his curatorship with the study of Mertens' Sitka collections (p. 32) and the South American collections of Langsdorff and Riedel. After Bongard's death in 1839, F. J. Ruprecht (1814–70) was curator for a time, but K. F. Meinshausen (1819–99) occupied this post during most of the latter half of the century (1851–96). Ruprecht later worked also at the Garden, until he became director of the Museum in 1855.

Very distinguished botanists were employed in the Museum during the 19th century and, although few in number, they published prolifically. Succeeding Trinius as director after his

death in 1844 was C. A. Meyer (1795–1855), who had previously been Fischer's assistant at the Garden and who had been taken into the Academy in 1839, with the death of Bonnard. Meyer continued his connections and work with the Garden until his death in 1855 and was the only botanist to have had the distinction of being director of both institutions during his lifetime. From 1850, when Fischer left and Meyer became director of the Garden too, he held both directorships simultaneously until the end of his life. Thus, he was the *second* director of both the Museum and the Garden. Meyer was followed in succession at the Museum by Ruprecht, Maximowicz, and Korshinsky, who closed out the century.

Ruprecht, under the tutelage of Trinius, first studied grass systematics, but later turned to floristics and geobotany. His classic flora of the St. Petersburg district, *Flora Ingrica*, is still interesting for the nomenclatural reformation attempted there. He strove for a sort of historical priority, recognizing the chaotic condition into which post-Linnaean literature was lapsing. He was the first to consider the historical development of the vegetation of Russia in his "Geobotanical Investigations on Chernozems" (1866). Ruprecht worked in the Museum for 31 years until his death in 1870, serving as director for the last 15 years. His chief regret was the shortage of scientific help, which made it impossible to *curate* the collections properly, to say nothing of studying them.

At the time of Ruprecht's death, C. J. Maximowicz¹⁴ (1827–1891) was chief botanist at the Imperial Botanic Garden, and he continued in this capacity, in charge of the Garden's herbarium, until he died, even though he was appointed director of the Botanical Museum in 1871. His earliest and most important major work on Russian plants was *Primitiae*

¹⁴K. I. Maximowicz in the Russian language.

Florae Amurensis, published in 1859. Along with Bieberstein's *Flora Taurico-Caucasica* (1808–19) and the *Flora Baicalensi-Dahurica* (1842–56) by N. S. Turczaninov (1796–1864), it is considered one of the great classical regional floras of Russia, which still have much value (5). From 1860 to 1864 Maximowicz traveled in Japan, and in 1866 he published his first paper on the plants of Japan. He soon accumulated the largest collection of Japanese plants that had ever been brought together—thanks in large part to his many contacts—and became an astute scholar of the Japanese flora. Among his many scholarly contributions on the flora of Japan are several extremely important papers (*Diagnoses Breves Plantarum Novarum Japoniae et Mandshuriae* [1866–77]; *Diagnoses Plantarum Novarum Asiaticarum* [1877–93]). A complete set of his Japanese collections can be found only in Leningrad today.¹⁵

The fortunes of the Museum began to change rather dramatically under Maximowicz's successor, S. I. Korshinsky (1861–1900), whose short but very significant tenure as director set the course of the Botanical Museum for years to come. When Maximowicz died, Professor Korshinsky was called from Tomsk University in 1892 by the Botanic Garden to fill the vacant position of chief botanist. A year later he was appointed director of the Museum as well, and continued to hold both positions until 1897, after which he devoted full time to the Museum. He died in 1900 at the early age of 39, having been director for only 7 years. It can truthfully be said that he "got the Museum moving again." Before coming to St. Petersburg he was already well known for his theoretical papers on the geography and systematics of the Russian flora. While at the Garden he published an interesting theoretical paper on

¹⁵Ohwi, Jisaburo. 1965. Flora of Japan (in English), edited by Frederick G. Meyer and Egbert H. Walker. Smithsonian Institution, Washington, D.C. 1067 pp. Cf. p. 7.

the origin of species ("Heterogenesis and Evolution," 1899). He is chiefly to be remembered, however, for organizing a number of very important research and publication efforts that were to last long after his death (see below) and for starting to expand the staff. In 1900, a second curator's position was authorized, and the mycologist V. G. Tranzschel (1868–1942)¹⁶ was brought to the Museum. Two years earlier, Korshinsky had also made a wise choice for the Museum when he brought in D. I. Litvinow (1854–1929), who was well known for his studies of Siberian and Turkmenian plants, to replace the late Meinshausen. The indefatigable Litvinow proved to be a "natural" for the curatorship, and he carried much of the burden of the work in the Museum during the early years of the 20th century.

Tranzschel immediately organized a Department of Cryptogamic Plants and vigorously began to build up the previously meager cryptogamic collections by means of expeditions and exchanges. Much help with mosses was given by V. F. Brotherus, a professor at Helsinki University, and two botanists at the Garden, A. A. Elenkin and V. P. Savicz, identified many of the lichens. In 1912, the bryologist L. I. Savicz-Lubitskaya joined the staff of the department. By 1931 this department also had its own phycologist (N.N. Voronikhin) and lichenologist (K. A. Rassadina), and mycologist Tranzschel was still active. In 1898, the Imperial Botanic Garden had organized its cryptogamic herbarium into a separate "Institute of Cryptogamic Plants," covering algae, fungi, lichens, and mosses. Thus, within 2 years of each other both the Museum and the Garden had recognized the importance of cryptogamic botany and strengthened its standing in their respective institutions.

After the untimely death of Korshinsky in 1900, Academician M. S. Voronin (1838–1903), a mycologist, was made

¹⁶Tranzschel's initials are sometimes given as V.A. rather than V.G.

acting director of the Museum, and two years later (1902) Academician I. P. Borodin (1847–1930) was appointed permanent director. Borodin served in this post until the end of his life, a period of about 28 years, and had the difficult task of managing the Museum during the closing years of the tsarist period, through the very trying years of civil war during the Revolution, and into the first years of Soviet power. At his death he was succeeded as director by V. L. Komarov (1869–1945).

Borodin¹⁷ attended Petersburg University in the 1860s, where he was one of the first students of the noted 19th-century Russian botanists A. N. Beketov (1825–1902) and A. S. Famintzin (1835–1918). Initially, his researches were in plant physiology, and in 1876 he published an important paper, “Physiological Investigations of the Respiration of Leafy Shoots,” which, along with other experimental researches, attracted foreign attention not only to him but to Russian botany in general. Later, when he assumed the directorship of the Botanical Museum, he became deeply involved in botanical education and administration. For a brief time (1917–19) he was vice president of the Academy of Sciences.

Some measure of Borodin’s stature and influence in Russian botany is provided by the fact that he was a central figure in the founding of the **Russian Botanical Society (RBO)** in 1915, today called the All-Union Botanical Society (*VBO*), and became its first president, serving until his death.¹⁸ Only

¹⁷И. П. Бородин (К 100-летию со дня рождения, 1847–1947). Бот. журн. СССР 32: 132–134 1947. (I. P. Borodin (K 100-letiyu dnya rozhdeniya, 1847–1947) [“To the 100th anniversary from birth”]. Bot. Zhurn. SSSR.)
—See also Lavrenko and Zalensky, footnote 18.

¹⁸RBO=*Russkoe Botanicheskoe Obshchestvo* (Русское Ботаническое Общество=РБО).

VBO=*Vsesoyuznoe Botanicheskoe Obshchestvo* (Всесоюзное Б. О.=ВБО).

Information on the Botanical Society and its journal is taken largely from the following two recent papers commemorating the 50th anniversary

three other Russian botanists have had the high distinction of this post, and, interestingly, all have been associated with the Leningrad botanical institutions.¹⁹ Borodin also is regarded today as the founder of the official journal of the Society, *Botanichesky Zhurnal*, first issued in 1916, and he served as editor-in-chief until his death (see p. 169). Despite the fact that he was nearly blind in his later years, he insisted on reading the printer's proofs personally.

From its inception the Russian Botanical Society had its headquarters at the Botanical Museum in Petrograd, directed by Borodin, and this affiliation continued until the merger of the Museum and Garden in 1931, after which the new Botan-

of the Society and journal. The first paper gives a lengthy historical sketch, and the second paper gives brief biographies of the 14 most prominent founding botanists, including I. P. Borodin. Cf. also Bobrov (in 8, p. 80).

Лавренко, Е. М., и А. А. Юнатов. 1965. Пятьдесят лет Всесоюзного ботанического общества. Бот. журн. 50: 1205-1247. (Lavrenko, E. M., and A. A. Yunatov. *Pyat'desyat let Vsesoyuznogo Botanicheskogo Obshchestvo* ["Fifty-year anniversary of the All-Union Botanical Society"]. Bot. Zhurn.)—A list of all branches of the Society is given at the end of the article.

Лавренко, Е. М., и О. В. Заленский. 1965. Ботаники-организаторы Русского ботанического общества (К 50-летию ВБО). Бот. журн. 50: 1751-1768. (С 15 портретами.) (Lavrenko, E. M., and O. V. Zalensky. *Botaniki-organizatory Russkogo Botanicheskogo Obshchestvo (K 50-letiyu VBO)* ["Organizing botanists of the Russian Botanical Society (To the 50th anniversary of VBO)"]. Bot. Zhurn. [With 15 portraits].)

Lavrenko, Yunatov, and Zalensky are all associated with the Komarov Botanical Institute at present, and Lavrenko is currently president of the All-Union Botanical Society (see footnote 19).

¹⁹Presidents of the All-Union (formerly Russian) Botanical Society:

1916-30	I. P. Borodin (1847-1930)
1930-45	V. L. Komarov (1869-1945)
1946-63	V. N. Sukaczev (1880-1967)
1963-	E. M. Lavrenko (1900-)

Borodin, Komarov, and Sukaczev served as editors-in-chief of the Society's Botanical Journal during their respective tenures, but Lavrenko does not also serve in this capacity. Borodin and Komarov held the presidency for life, but Academician Sukaczev retired from this post while in good health and served as Honorary President. He was one of the oldest and most revered botanists in the Soviet Union when he died on February 9, 1967 [while this book was in press].

ical Institute became the headquarters, remaining so until the present time. Today the All-Union Botanical Society still depends heavily on the Institute for basic support and leadership.²⁰ The long-standing close association of the Botanical Society with Leningrad's Botanical Institute and its predecessor institution can be appreciated from the fact that the Society and the Institute celebrated their 50th and 250th anniversaries, respectively, in joint meetings at the Institute on December 15–18, 1965 (see p. 191). In view of this intimate relationship and of the lifelong dedication of Borodin to the work of the Society, I will digress briefly to consider the origins of the Russian Botanical Society before returning to the work of the Botanical Museum.

The Russian Botanical Society was officially founded in December 1915 at a meeting of 29 leading botanists, representing institutions all around the country, held in Petrograd under the auspices of the Academy of Sciences. The planning had been instigated in April of that same year by Kiev botanists. The pioneer Russian cytologist S. G. Nавашин (1857–1930) and two of his eminent colleagues, A. V. Fomin (1869–1935) and E. F. Votchal (1864–1937), addressed a petition on behalf of the Kiev Society of Naturalists, to Petrograd's and the whole country's most senior botanists, Academicians Borodin and Famintzin, requesting that the Academy of Sciences convene a special meeting of Russian botanists to consider founding both a botanical society and an official journal for the society. This proposal was received favorably, and Borodin, supported by the elder Famintzin, now 80 years old, began at once to lay the groundwork.

In the fall of 1915, the Botanical Section of the Petrograd

²⁰Cf. remarks, signed by both the All-Union Botanical Society and the Editorial Board of *Botanichesky Zhurnal*, prefaced to the November 1965 issue of the journal (50[11]: I–IV), saluting the Botanical Institute's 250th anniversary.

Society of Naturalists elected an *ad hoc* committee of eight to draw up a constitution. This committee (Borodin, N. A. Busch, L. A. Ivanov, V. L. Komarov, S. P. Kostychev, G. A. Nadson, A. A. Richter, V. N. Sukaczev) also drew up a plan for a botanical journal, and its work was approved at the founding meeting in December 20–21. At that meeting a smaller committee, selected from the *ad hoc* committee, was appointed to complete the work of organizing the society and its journal. This committee, chaired by Borodin, also included Busch, Komarov, Kostychev, and Sukaczev.

The first annual meeting of the new Russian Botanical Society was held in Moscow on December 16–19, 1916. By this time the Society already had about 150 members, including the 29 charter members. The Society's first Council (*Soviet*) was elected. Academician Famintzin was named honorary president, and the other members of the Council's executive committee were: Borodin, president; Navashin and V. I. Palladin, comrade presidents; Busch, secretary; Sukaczev, treasurer; Komarov, Kostychev, and V. G. Tranzschel. It is noteworthy that all of these officers were now living and working in Petrograd. In addition, the Council also had representatives from those cities of the USSR which had five or more members in the Society. This meeting also elected the first Editorial Board of the Botanical Journal (executive committee except Famintzin and Navashin) and named the first honorary members of the Society, who were Borodin, Famintzin, J. S. Medvedev, Navashin, L. V. Reinhardt, E. P. Sheremetevaya, and K. A. Timiryazev.

Today the All-Union Botanical Society boasts 43 affiliated branches throughout the Soviet Union with 4200 active members, including 900 from Leningrad and Moscow. Growth has been especially great in the postwar years, being almost three-fold, both in branches and members, since 1956. Some of the

major branches rank as "Republic" botanical societies (e.g., Ukrainian Botanical Society), but are affiliated to the All-Union Society with the rights of regular branches. The Leningrad Branch is the "central organization" of the Society.

Through the years the Society's fortunes have experienced some ups and downs. The most difficult years were 1932-45, when the Academy lost control of the Society, and the Society lost control of its official journal. At its lowest point in 1932 the Society almost ceased to exist, and in 1935 there were only 228 registered members. During these years the Society was placed under the jurisdiction of the Peoples' Commissariat of Education of the Russian Federated Republic (*RSFSR*) and called the State All-Russian Botanical Society. Official gatherings were difficult or impossible except on a local scale. In 1945, the Society was again returned to the jurisdiction of the Academy of Sciences, and the Botanical Journal again became the official organ. At this time the Society was renamed the All-Union Botanical Society of the Academy of Sciences of the USSR. Since then meetings and conferences have been resumed on a national scale, and the work of the Society has expanded enormously.

* * *

When Borodin took over the Botanical Museum, his staff consisted of Litvinow and Tranzschel, but during his directorship it was expanded sixfold. In 1912, four new botanists joined the staff, and in the next 2 years three more were added so that the vascular herbarium could now be divided into departments (*Bobrov* *in* 8, p. 79):²¹ All Non-European Countries, Western Europe, European Russia, Caucasus and

²¹ Schischkin, several pages later in the same book (8, p. 81), gives a slightly different breakdown of the herbarium departments: Crimea-Caucasus, Turkestan, European Russia, Siberia and Far East, and General Herbarium. The chief difference is that All Non-European Countries and Western Europe are combined into the General Herbarium.

Crimea, Turkestan, Siberia, and Eastern Asia. By 1917 and the time of the Revolution, the following botanists were on the staff of the Museum: Vascular Herbarium—I. P. Borodin (Director of Museum), D. I. Litvinow, N. A. Busch, E. A. Busch, P. N. Krylov, V. N. Sukaczhev, B. N. Gorodkov, S. S. Ganeshin, and E. I. Steinberg; Cryptogamic Herbarium—V. G. Tranzschel, L. I. Savicz-Lubitskaya, and K. A. Rassadina. After the Revolution the staff size remained stabilized more or less at about a dozen botanists, although changes occurred of course. In 1930, just prior to the merger with the Garden, the staff was comprised of the following botanists: Vascular Herbarium—V. L. Komarov (Director of Museum), B. K. Schischkin, N. A. Busch, E. A. Busch, Gorodkov, Ganeshin, Steinberg, and A. I. Tolmatchev; Cryptogamic Herbarium—Tranzschel, N. N. Voronikhin, Savicz-Lubitskaya, and Rassadina.

Over the years the main tasks and goals of the Museum tended to be very similar to those being pursued by the Botanic Garden, although the latter institution always had the larger staff and carried out a wider range of research activities. The Academy's institution was after all a "museum," and its botanical research was almost entirely herbarium-oriented; however, in the mid-19th century Academician N. I. Zheleznov was conducting the first Russian researches and some of the earliest in general on plant embryology and the physiology of development. The Botanic Garden, on the other hand, not only had a herbarium and carried on many herbarium-related investigations, but it was also an orthodox "garden" with outdoor and indoor plantings. Thus, the Garden staff was able to branch out into experimental botany and horticulture. The Museum scientists confined themselves almost exclusively to floristics, systematics, and phytogeography. In many ways the Garden completely overshadowed the Museum through the

years; nevertheless, many highly important contributions came from the Museum staff.

It is quite clear from what has already been said that the lines between the Garden and Museum were not always sharply drawn. There was much collaboration and crossing back and forth between the two institutions by the respective staffs, and not just a few of the outstanding St. Petersburg botanists held positions in both the Museum and the Garden at one time or another during their professional careers. In fact, as previously indicated, it was not uncommon for botanists elected to the Academy to hold positions in both institutions simultaneously. This seems to have been particularly true in the 19th century when well-trained botanists were scarce in Imperial Russia. The Garden seemed to lead the way in bringing talented scholars to St. Petersburg, and the Museum often pirated the Garden talent when it had vacancies or new openings.

The principal mission of the botanists at the Museum was to investigate the flora and vegetation of Russia and neighboring countries, and to this end through the years the Academy sent numerous expeditions to all parts of the vast Russian domain. After 1835, the Botanical Museum took the place of the *Kunstkammer* as the national repository for botanical collections made in the name of the Academy, and the Museum's prestige also attracted many other important collections made by botanists not affiliated with the Academy. As a result, the herbarium of the Museum, which began to grow rapidly after Trinius arrived, increased steadily in size until by 1917 it contained about 1.3 million specimens (Schischkin *in* 8, p. 81). Of all the important collections that came to reside in the Botanical Museum, perhaps the two most valuable were Bieberstein's herbarium (p. 45), secured by Trinius in 1828, and Trinius' own herbarium, documenting his many taxo-

nomic papers on the Gramineae, which he turned over to the Academy in 1841. These two herbaria have been maintained separately from the general herbarium even to the present day. Other extremely valuable herbaria acquired by the Museum during the 19th century were those of Bongard (mosses), Borszczov, Chamisso (shores of Bering Sea), Korshinsky, Mertens (Russian America), Nees, and Ruprecht. One of the most important Alaskan collections, apart from Mertens' collection, was Kastalsky's, mentioned earlier (p. 32) in connection with Alaskan exploration.

After 1900 the expeditionary work of the Museum increased considerably, and a vigorous program of fieldwork was carried on right up to the time of the merger in 1931 (2, 8, 9, 10). Litvinow and Borodin conducted a series of expeditions to eastern Siberia and the Russian Far East early in the century in connection with their researches for the "Flora of Siberia and the Far East." Later, Litvinow carried out extensive fieldwork in the Leningrad region and across the Kola Peninsula. Other important expeditions during this period took the Museum's botanists all over Russia, and their fieldwork resulted in some significant publications. The efforts of the following botanists are particularly noteworthy: Sukaczev (Lake Baikal, 1912–18), Krylov (Central Siberia, 1915–16), Ganeshin (Kola Peninsula, 1917–30), Gorodkov (Western Siberia and Arctic Urals, 1917–31), N. A. and E. A. Busch (Caucasus, 1925–30), and Tolmatchev (Arctic Russia, 1926–30). Tolmatchev (1903–) has become widely known for his botanical studies of the Russian Arctic, which have resulted in numerous systematic and floristic papers. In 1960, the first part of his comprehensive and taxonomically critical "Arctic Flora of the USSR" was published, and four more parts have appeared since (1963, 1964, 1966). The first four parts cover the monocotyledons. The fifth part begins the dicotyle-

dons. When completed, this "Flora," which includes keys, descriptions, critical notes, and many range maps, will constitute a major contribution to our knowledge of the circum-polar arctic flora. Tolmatchev worked in the Museum from 1926 to 1930 (see also footnote on p. 137).

During the first years of its existence the Botanical Museum did not have a publication outlet of its own, and the contributions of its staff were published in several journals of the Academy of Sciences, e.g., the "Mémoires." Bongard's paper on the Mertens collections from Sitka was published as a mémoire of the Academy in 1833 (p. 32). In 1844, at the instigation of Meyer the Museum undertook to publish the serial *Beiträge zur Pflanzenkunde des Russischen Reiches*, which continued through 11 volumes until 1859, when it was discontinued after the reorganization of the Academy's "Mémoires" series. It was one of the first Russian botanical journals and carried important contributions by Ruprecht, Meyer, I. G. Borsczov, and other botanists of the times in St. Petersburg. The character and pulse of research in the Museum during that period can be gauged fairly well from the contents of this journal. The major papers were local and regional floras representing significant pioneer efforts toward describing the complete flora of Russia. After 1871, Museum contributions were sometimes published in the Imperial Botanic Garden's new periodical, *Acta Horti Petropolitani*.

The first organized publication efforts at the Museum began after Korshinsky became director in 1893. He initiated an ambitious project to write a "Flora of Imperial Russia." Considering the limited resources of the Museum, he undertook as the first stage the preparation of a "Flora of Siberia and the Far East," which seemed a feasible goal. The decision to begin with this part of Russia was related no doubt to the coming of Litvinow in 1898, who was already deep in research



Courtesy Smithsonian Institution

K. A. Триниус
Carl B. Trinius (1778-1844),
first director of Botanical Museum, 1835-44.



Ф. И. Рупрехт
Franz J. Ruprecht (1814-1870), director of Botanical Museum 1855-70.



К. И. Максимович
Carl J. Maximowicz (1827-1891), director of Botanical Museum 1871-91.



Сергей И. Коржинский
Sergei I. Korshinsky (1861-1900), director of Botanical Museum 1893-1900.

From Baranov and Bobrov (8)



Иван П. Бородин
Ivan P. Borodin (1847-1930), director of Botanical Museum 1902-30.

CHARTER MEMBERS OF ALL-UNION BOTANICAL SOCIETY

Seated, left to right: Н. В. Цингер (N. V. Tsinger), В. Ф. Хмелевский (V. F. Khmelevskiy), С. П. Кошачев (S. P. Kosychev), Х. Я. Гоби (Kh. J. Gobi), И. П. Бородин (I. P. Borodin), Н. А. Бум (N. A. Busch), С. П. Постников (S. P. Postnikov), Д. Н. Принципников (D. N. Pryanishnikov), Ф. В. Бухгольц (F. V. Buchholz).
Standing, left to right: А. В. Ромин (A. V. Romin), В. И. Талиев (V. I. Taliiev), Б. А. Келлер (B. A. Keller), Б. А. Федченко (B. A. Fedtschenko), А. Г. Генеев (A. G. Genkev), Б. В. Гриневецкий (B. B. Grinevetskiy), В. Н. Любименко (V. N. Lubimenko), Е. Ф. Ворчал (E. F. Vorchal), Г. А. Надсон (G. A. Nadson), Р. Ю. Переев (R. E. Regel), В. К. Баринов (V. K. Barinov), В. И. Комаров (V. I. Komarov), Б. Л. Исаченко (B. L. Isachenko), П. И. Минченко (P. I. Mishchenko), В. Н. Сукачев (V. N. Sukachev), А. А. Рихтер (A. A. Richter), Н. А. Наумов (N. A. Naumov).



on Siberia and the Far East. Unfortunately, Korshinsky did not live to see any of this "Flora" appear. The work had to be carried on by Borodin and Litvinow after 1900. The first part of the Siberian "Flora" came out in 1913, and by 1931 nine parts had appeared, covering five families of flowering plants (by N. A. and E. A. Busch) and the Filicales (by A. V. Fomin).

These were the only parts ever to appear of both the "Flora of Siberia and the Far East" and the grandiose "Flora of Imperial Russia." At the time of the merger in 1931 the whole project was discontinued, and all further efforts were joined in the new project of the Botanical Institute to write *Flora SSSR* (p. 136). The staff and other resources of the Botanical Museum had proved inadequate for Korshinsky's imaginative undertaking and had not succeeded in completing even a tenth of the Siberian "Flora." Complicating the Museum project, by depleting the already limited supply of botanical scholars in Russia, was the parallel flora project of B. A. Fedtschenko and A. F. Flerow at the Botanic Garden. They were marshalling the Garden's forces to write a "Flora of Asiatic Russia," and 15 fascicles of this "Flora," under the authorship of Brotherus, Kozo-Poljansky, Turkevicz, Roshevitz, Nekrassova, and Popov, came out between 1918 and 1931, covering perhaps 10 percent of the plants. Lebedev (*in 8*, p. 287) cites this Museum-Garden duplication as a prime example of the poor scientific planning in Tsarist Russia. Bobrov (9) gives a concise account of the most important floristic researches undertaken late in the last century and early in the present century.

Korshinsky was responsible also for initiating the new Museum journal *Travaux de Musée Botanique de l'Academie des Sciences de St.-Pétersbourg*, although actual publication did not begin until 1902, 2 years after his death. It continued through 25 volumes by 1932, when it was discontinued, and

meanwhile underwent several minor name changes, corresponding to Museum name changes. It was really the successor of the earlier *Beiträge*. Many valuable papers and monographs on floristics, systematics, and geobotany appeared in the *Travaux* during its 30-year history. Two early papers of special note were Litvinow's "Bibliography of the Siberian Flora" (1904) and Borodin's "Collectors and Collections of the Siberian Flora" (1908). These papers were prepared as a part of the preliminary work on the "Flora of Siberia and the Far East." Originally, Korshinsky envisioned that the larger Russian flora project would provide a whole series of reference works to accompany the actual "Flora" itself.

One of the most valuable "publication" efforts initiated by Korshinsky was the documented *exsiccatae* distribution of Russian plants begun in 1898 under the Latin title *Schedae ad Herbarium Florae Rossicae* and continued at irregular intervals down to the present time (8, p. 288; see also my p. 168). The documented labels that accompanied the specimens were also printed in booklet form and were arranged numerically by species numbers. Each fascicle of *exsiccatae* consisted of 50 species, and 50 sets of each fascicle were distributed to leading foreign and domestic herbaria. This meant that for every fascicle distributed, a total of 2500 herbarium specimens or sheets were sent out. Thus, the first distribution, which was published as Booklet No. 1 and was comprised of four fascicles and species 1-200, totaled 10,000 specimens. This was primarily the work of Litvinow who carried the chief responsibility for the *exsiccatae* series until his retirement, after which the distributions lapsed for 10 years (1922-32). From 1900 to 1922, he sent out 2600 species (Nos. 201-2800), representing booklets 2-8, fascicles 5-55, and a total of 130,000 specimens!

During the nearly 100 years (1835-1931) of its inde-

pendent existence the Botanical Museum of the Academy of Sciences had the following succession of directors: C. B. Trinius (1835-44), C. A. Meyer (1844-55), F. J. Ruprecht (1855-70), C. J. Maximowicz (1871-91), S. I. Korshinsky (1893-1900),²² M. S. Voronin (1900-02), I. P. Borodin (1902-30), and V. L. Komarov (1930-31).

The most striking feature of the director's post during all those years is that with only two exceptions the incumbents occupied it for life once they were appointed. Voronin was only a temporary director, and Komarov's term was interrupted by the merger in 1931. There was no compulsory retirement age, obviously, and there seems cause to believe that the work of the Museum was stifled more than once during its history by an aging director. The Museum hierarchy was very strong and largely based on seniority, and the influence of the most elite academicians was considerable. Even today the rigid seniority hierarchy at the Komarov Institute probably tends to stifle some research initiative and responsibility at the lower levels, but this feature is not unusual for a bureaucracy anywhere.

²²There is a 2-year gap between the directorships of Maximowicz and Korshinsky which is not accounted for.

CHAPTER

5

Botanic Garden of the Academy of Sciences

1735-1812

Russia's Imperial Academy of Sciences had barely been founded when (1726) the first agitation began for the Academy to have its own botanic garden. In 1735²³ this agitation culminated in the formation of a botanic garden on Vassilevsky Island, lying between the Big and Little Neva branches southwest of Aptekarsky Island. It was developed from a private garden on the island, acquired by the Academy, and functioned for 77 years until a complex of circumstances, partly obscure, forced its closing in 1812. Sometime after 1800 the Botanic Garden of the Academy was moved off the island to another location in the city. In the mid-18th century there were upward to 600 species of plants under culture in the Garden, and during the final years of the Garden more

²³The exact date of founding seems to be a matter of disagreement. Lebedev, in his official chronology (2, 8), gave the year 1733, but other authoritative sources (3; Baranov in 8, p. 17) indicate 1735.

than 2000 species were being cultured. It was at the Garden where Mikhail V. Lomonosov (1711–65), the renowned 18th-century Russian poet-scientist, was given his first living quarters after returning from abroad (1741), and here the first chemistry laboratory in Russia was constructed for Lomonosov in 1748.

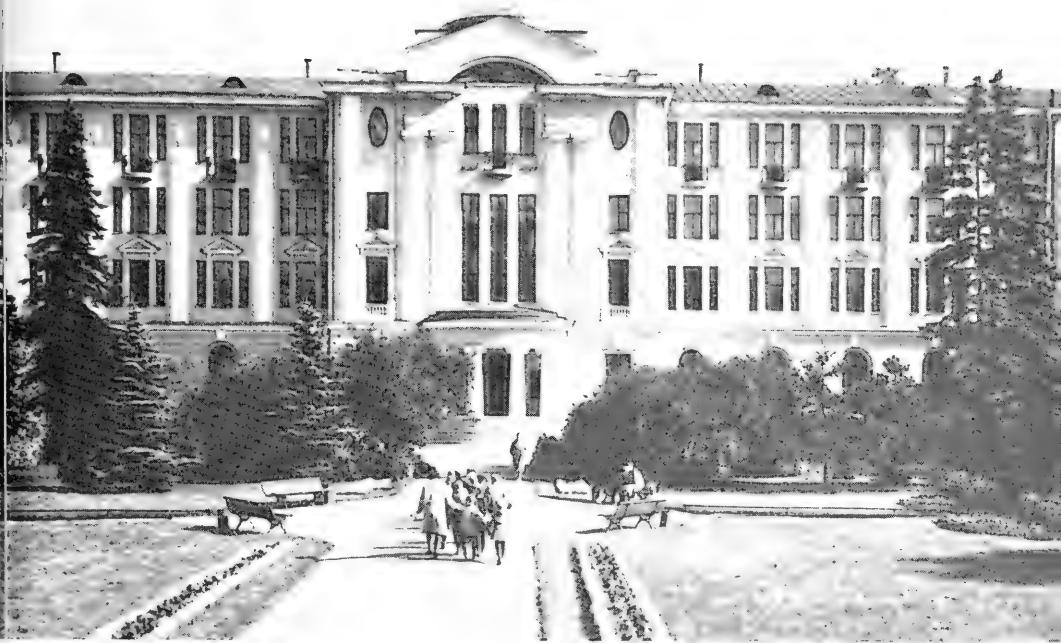
Academician Johann Amman (1707–41) was the first director, and he held this post until his death (1735–41). He was succeeded by Siegesbeck who at the time was directing *Meditzinsky Sad* on Aptekarsky Island (see p. 26).

J. G. Siegesbeck headed the Academy's Garden from 1741 to 1747 when, primarily because of his cantankerous nature, he was relieved of his post; he returned to his native Germany, where he died in 1755 (see footnote on p. 27). For less than a year (during 1747) the elder Johann Gmelin (1709–55), who was widely known for his studies of Siberian plants and had been elected to the Academy in 1731, served as director. He was soon followed by his former student assistant, the noted Kamtchatkan explorer Academician S. P. Krasheninnikov (1711–55). Krasheninnikov had accompanied Captain Bering on the Second Kamtchatkan Expedition (1732–43) as Gmelin's personal representative (see also discussion on p. 31). As a result of this work he published his classic, widely translated "Description of the Land of Kamtchatka" (1755, 2 vols.). For some reason his directorship lasted only 2 years (1747–49). Baranov (8, p. 18) ranks him as the *first* native Russian botanist. Apparently he was a scholar of great promise, but he died prematurely at the age of 43.

The directorship of the Academy's Garden changed hands frequently during the next years, and the record is confusing. All the interim directors had short terms. Then in 1774, I. I. Lepechin (1740–1802), an academician and one of the most noted Russian botanists of the time, became director; he man-

aged the Garden for 28 years, until his death. Following him for brief periods before the Garden closed were I. J. Rudolph (1754–1809), who directed the Garden from 1804 to 1809, and T. A. Smelowsky, who directed the Garden in its final years (1809–1812).

Thus, throughout much of the 18th century and the earliest years of the 19th, St. Petersburg had in effect *three* botanical institutions. Under the management of the Imperial Academy of Sciences were the “Botanic Garden” on Vassilevsky Island and the botanical collections of the *Kunstkammer*, later reorganized into the “Botanical Museum”; and under the direction of the Government was the tsars’ “Medicinal Garden,” later reorganized into the “Imperial Botanic Garden,” located on Aptekarsky Island. After 1812 and the closing of the Garden of Vassilevsky Island, the Academy did not have its own botanic garden again until 1930, when the Principal (formerly Imperial) Botanic Garden of the USSR was transferred to the jurisdiction of the Soviet Academy of Sciences (see footnote on p. 40). (3,8)



Courtesy Komarov Botanical Institute

Herbarium-Library Building, dedicated in 1913. *Below*, Scene on grounds of Botanical Institute.

Photograph by Arthur Cronquist





Catalog and reference room of library, 1965.



Reading room of library.

CHAPTER

6

Komarov Botanical Institute 1931-1966

In April 1931 at a regular session of the Soviet Academy of Sciences, held in Leningrad, the decision to end the 100-year parallel existence of the Botanic Garden and the Botanical Museum was taken. Not only were both institutions located in the same city, but by now they were also both units of the Academy of Sciences (see Introduction, p. 23). Therefore, the time was ripe for merger, and this session of the Academy passed a resolution declaring that the two institutions be united into a single organization known as the "Botanical Institute of the Academy of Sciences of the USSR." On the first day of October of that same year the separate status of the Garden and Museum was legally ended, but the actual merger was not physically begun until January 1932, and lasted about 5 months. Eight years later, on May 4, 1940, the Botanical Institute was named in honor of V. L. Komarov, who was then its oldest and most distinguished botanist and scholar and who was also president of the Academy of Sciences. The name now became the "Botanical Institute in the Name

of V. L. Komarov of the Academy of Sciences of the USSR."²⁴ In the English language this name is more appropriately rendered the "Komarov Botanical Institute." (2, 8; cf. especially Schischkin in 8, who gives date of renaming as 1939)

The merger was not exactly a spontaneous action of the respective administrators at the Botanic Garden and Botanical Museum. There were larger factors involving the whole of Soviet science, which are discussed in a later section (see p. 175).

The buildings and grounds of the Botanic Garden on Aptekarsky Island became the home of the new Botanical Institute, and the resources and staff of the Botanical Museum were transferred there. The Museum's herbarium and library were intercalated into the existing herbarium and library of the Garden, housed in the four-story Herbarium-Library Building that had been dedicated in 1913 when the 200th anniversary²⁵ of the Imperial Botanic Garden was celebrated. Non-essential duplicate volumes and serials in the Museum's library were turned over to the main library of the Academy in Leningrad, and after World War II they were transferred to the library of the "Principal Botanic Garden of the USSR," now located in Moscow. The newly combined Museum-Garden library contained several hundred thousand pieces of botanical literature—it was already second to none among botanical libraries in the Soviet Union. At a later time the Institute's library was integrated into the library system of the Academy of Sciences as a botanical branch of the Central Library. The library was housed on the first floor of the

²⁴Ботанический институт им. В. Л. Комарова Академии наук СССР.

²⁵The 200th anniversary was based on a founding date of 1713, but the 250th anniversary, celebrated in 1964, was based on the date 1714. In both cases the date of founding is traced to Peter the Great and not to the major reorganization coincident with Fischer's arrival in 1823, which date is given in official chronologies (2,8) as the founding date of the Imperial Botanic Garden.

Herbarium-Library Building, and the herbarium occupied the upper three floors. Today the library and herbarium of the Institute are still housed in this building, which by now is becoming crowded and outmoded.

The new Botanical Institute was comprised of a series of "departments," the chief of which was the "Department of Systematics and Geography of Vascular Plants," under the direction of V. L. Komarov.²⁶ At first this department consisted of little more than the combined Garden-Museum vascular herbarium, but today it includes several other important laboratories, discussed later. The same geographic organization that had been used in the Garden's herbarium since the Revolution (see list of divisions, p. 39) was retained for the new herbarium of the Institute, and this organization is basically unchanged even now. Besides Komarov's department, the following other departments were organized within the Institute: (1) Department of Cryptogamic Plants (Chief, V. P. Savicz), (2) Department of Geobotany (Chief, N. I. Kuznetsov), (3) Department of Experimental Botany (Chief, V. N. Lubimenko), (4) Department of Living Plants (i.e., Botanic Garden; Chief, A. P. Iljinsky), (5) Public Museum (Chief, I. V. Palibin), and (6) Library.

ORIGINAL STAFF AND RESOURCES

The "charter" staff was comprised of more than 250 employees including both the scientific and laboring forces. Prior to the merger the Museum and Garden had long represented the two largest botanical institutions in the Soviet Union, and

²⁶The official name of this department has varied considerably with the translation. Until recently, the Russians themselves have usually translated the name as given above, but now they are starting to call it simply the Department of Vascular (or Higher) Plants. For convenience, I have used this shorter title in most contexts in this paper (cf. also footnote 41 on p. 121).

their fusion immediately created *the leading center* for botanical research in the whole country, which it has remained to the present time. Concentrated in the Institute at that time—as indeed ever since—was the largest and most important botanical staff of the USSR, which included many distinguished scholars. Some of the more outstanding members of the combined scientific staff right after the merger were (3): V. A. Brilliant (1888–1954), E. A. Busch (1886–1960), N. A. Busch (1869–1941), A. N. Danilov (1879–1942), V. A. Dubjansky (1877–1962), A. A. Elenkin (1873–1942), B. A. Fedtschenko (1872–1947), B. N. Gorodkov (1890–1953), A. P. Iljinsky (1888–1945), B. L. Isatchenko (1871–1948), S. V. Juzepczuk (1893–1959), B. N. Klopotov (1882–1942), V. L. Komarov (1869–1945), I. M. Krasheninnikov (1884–1947), V. I. Kreczetovicz (1901–1942), N. I. Kuznetsov (1864–1932), V. N. Lubimenko (1873–1937), V. P. Maleev (1894–1941), N. N. Monteverde (1885–1952), G. A. Nadson (1867–1942), I. A. Ol (1884–1943), I. V. Palibin (1872–1949), R. U. Roshevitz (1882–1949), B. K. Schischkin (1886–1963), N. V. Shipchinsky (1886–1955), and V. G. Tranzschel (1868–1942).

Among the eminent botanists of the original staff who are still living and for the most part active at the Institute even though in many cases retired are: A. G. Bekriashova-Borisova (1903–), E. G. Bobrov (1902–), A. S. Bondarzhev (1877–), M. M. Ilijin (1889–), O. E. Knorring-Neustrueva, V. L. Nekrassova (1881–), A. A. Nikitin, T. L. Nikolayeva (1902–), A. I. Pojarkova, K. A. Rassadina (1903–), V. P. Savicz (1885–), L. I. Savicz-Lubitskaya (1886–), and S. J. Sokolov.

From its inception the Institute was organized to embrace all branches of plant science, both theoretical and applied, and new lines of research have been added steadily through

the years. For example, in 1952 P. A. Yakimov's Laboratory of Lower Plant Biochemistry, conducting research on antibiotics, was transferred from Leningrad State University to the Institute, and that same year a Department of Paleobotany, including palynology, was founded under the leadership of A. N. Krishtofovich (see p. 105).

During the early years, in particular, the Institute distinguished itself chiefly in the areas of systematics, floristics, and geobotany. This is evident from the roster of specialists above, most of whom are known for their contributions in these areas. After the merger, the combined vascular and non-vascular herbaria of the Garden and Museum totaled about 5 million specimens (Schischkin *in 8*, p. 87). This fairly enormous herbarium and its staff formed the backbone of the Institute, as already indicated, and the herbarium continued to be the primary locus of activity during the 1930s. Although the Komarov Herbarium has never been spoken of in these terms, from the outset it has constituted in reality the "National Herbarium" of the Soviet Union, just as in earlier years the separate herbaria of the Garden and Museum served together in this role. Thus, from its very beginning the Botanical Institute has continued to hold within its structure the single largest research force of plant taxonomists in the entire Soviet Union.

Among the important resources contributed to the Institute by the former Botanic Garden, in addition to its enormous library and herbarium, were its large arboretum-park, outdoor nurseries, and greenhouses with their wealth of living plant collections. By 1931 the Garden occupied more than 22 hectares (about 55 acres) on Aptekarsky Island and possessed a series of more than two dozen greenhouses and conservatories including one very large "Palm Conservatory" and the widely known "Victoria Conservatory," where *Victoria amazonica*,

V. cruciana, and other unique tropical aquatic species were being cultured. The greenhouses were arranged in a quadrangle that covered about 1 hectare (about 2.5 acres). Some 15,000 tropical and subtropical plants, including a rich collection of tree ferns, cycads, and palms, could be found in the greenhouses. In the early part of the 19th century (1824; cf. 11) the eastern part of the Garden's grounds was laid out as a formal park, and this part of the park has remained unchanged to the present time; trees planted then are still living. This park constituted an arboretum which, coupled with other outdoor nursery gardens, provided the Department of Living Plants of the new Institute with experimental test plots for the introduction and acclimatization of exotic species. Perhaps 500 species of woody plants and several thousand species of herbaceous perennials and annuals could be found among the outdoor plantings of the Garden during a summer season at that time. (3, 7, Sokolov in 8, 11, 12)

The museum department of the newly created Institute contained about 60,000 specimens: fruits and seeds (32,000), woods (10,000), plant products (12,000), fossil plants (4000), and miscellaneous objects (13; see also pp. 98, 118).

DIRECTORSHIP

B. A. Keller

Academician Boris A. Keller (1874–1945), an eminent geobotanist, was elected the first director of the newly created Botanical Institute in 1931. At least during his first years as director, Keller led with vigor and initiated or facilitated important new programs, including the undertaking of *Flora SSSR*. He also continued active research.

Sources disagree on the exact duration of his directorship. According to Lebedev *et al.* (2, p. 93), Keller was “relieved”

of his post on March 15, 1938, and B. K. Schischkin was appointed director on June 1, 1939, with J. D. Zinserling and E. G. Bobrov filling in as interim directors. However, according to the present director, Prof. Aleksandr A. Fëdorov, Keller was reassigned in 1936 to the directorship of the Principal Botanic Garden of the USSR in Moscow, although he did not actually move from Leningrad to Moscow until 1938; Zinserling, and then, for several months, Bobrov, served as acting director in the years 1936–38; finally, in 1938 Schischkin was named permanent director (correspondence, 1966). Bobrov also places the beginning of Schischkin's directorship in 1938 (see below).

B. K. Schischkin

Boris K. Schischkin (1886–1963) became the second permanent director of the Botanical Institute. Concerning the year he assumed this post, Bobrov (14) makes the following statement in his short biography of Schischkin:

In 1938 at the general Assembly of the Academy of Sciences of the USSR B. K. Schischkin was elected director of the Botanical Institute. He occupied this post for eleven years [until 1949] during what was probably the most difficult period in the history of the Institute.

Whether Schischkin's administration began in 1938 or 1939, Bobrov's words about the difficult period that followed are an understatement.

Assuming office during the height of Stalin's great purge, Schischkin carried the double burden of all public figures in the Soviet Union at that time—that of proving not only their own patriotism but also of proving the deep devotion of their organizations to the regime's nationalistic goals. Professor Schischkin already was a scholar of unimpeachable qualifications and a quiet but effective leader-by-example who engen-

dered great confidence on the part of his subordinates and colleagues as well as his superiors. Thus he was a natural choice for this difficult time, and it doubtless was no accident that a man of his qualifications was chosen for director. He was not an "ambitious" man in the bad sense of the word, or a man given to political intrigues. On the top of this domestic upheaval, Schischkin was soon faced with the outbreak of World War II and all the consequences it brought upon the Institute (see p. 100). Altogether, his directorship was hardly a tranquil one.

When Schischkin died on May 1, 1963, after a protracted illness, his renown as a plant taxonomist was worldwide, and he was especially well known for his numerous floristic researches and his systematic studies of the families Caryophyllaceae and Umbelliferae. Outside the Soviet Union he was perhaps the one best known Russian botanist of recent years, and he is surely to be ranked among the most distinguished Soviet botanists of the modern period. He was a scholarly botanist in the best tradition, whose place in the history of botany is well secured. It is appropriate, therefore, that a brief biography of him be given here in this historical sketch of the Komarov Institute.

Schischkin (14) was born in 1886 in a provincial region of western Siberia and graduated from Tomsk University in 1911. Here, in Siberia's oldest university, he came under the influence of Prof. P. N. Krylov, the eminent student of Siberian plants, whose "Flora of Western Siberia" is still a classic among Russian regional floras. Highly regarded among Russian botanists, it is in my own opinion still unequalled by other Soviet floristic works, including the monumental *Flora SSSR*, for its critical taxonomic and geographic detail. The plan for this work was laid out shortly after Schischkin joined the faculty of Tomsk University in 1925; but for Schischkin's

persistent efforts this work would doubtless have never been completed. It was to constitute a revision of Krylov's earlier "Flora of Altai Territory and Tomsk Province" (1901-14), but it was so thoroughly revised and geographically enlarged as to constitute in the end a wholly new work. The first volume appeared in 1927, the eleventh and final in 1949 (22 years). Krylov lived to see only the first 4 volumes appear; Schischkin, assisted by several other specialists, saw it to the finish, through all 11 volumes. Altogether, his Tomsk years were very active ones for studying and publishing on the flora of Western Siberia.

Earlier (1915-17), while serving during World War I as a medical officer on the Turkish Front in Transcaucasia, Schischkin took up studies of the flora of Armenia and Turkish Armenia. These studies culminated years later in his "Materials of the Flora of Turkish Armenia," the first part of which appeared in 1929. From 1918 to 1924 he worked as a botanist in the herbarium of the Georgian State Museum in Tbilisi (formerly Tiflis), publishing on the flora of the Caucasus. During this period he began his lifelong researches on Caryophyllaceae and Umbelliferae, later writing most of the treatments of these families for *Flora SSSR*.

Schischkin left Tomsk University in 1931 to join the staff of the Botanical Museum of the Academy of Sciences in Leningrad. When the Museum and the Botanic Garden were merged shortly thereafter, he became a senior botanist in the united herbaria of the newly established Botanical Institute. During the rest of his life he served in the Institute in one capacity or another, and throughout these more than 30 years his active research was connected largely with the preparation of *Flora SSSR* (see p. 156). During his directorship (1938-49) the Laboratory of Paleobotany and the Laboratory of Anatomy and Morphology were established, and he carried

the responsibility in the immediate postwar period for starting to rebuild the almost completely destroyed greenhouse complex. After Komarov's death in 1945, Schischkin became the head of the Department of Systematics and Geography of Vascular Plants. Thus, to him passed the "mantle" of his revered predecessors in this century, B. A. Fedtschenko and V. L. Komarov, and the great distinction and responsibility of directing the largest group of plant taxonomists in the Soviet Union. In this capacity he edited all the department's serials and many of its large floristic works, including *Flora SSSR*. Earlier (1938-45) he had served a term as editor of the journal *Sovetskaya Botanika*. Since 1948 he had served on the editorial board of *Botanichesky Zhurnal*, successor to the other journal. During World War II (1943) Schischkin was accorded the high distinction of being elected a corresponding member of the Academy of Sciences of the USSR.

At the Institute Professor Schischkin advised many graduate students over the years in the preparation of candidate's and doctor's dissertations, and after the war he resumed teaching again. From 1945 to 1958 he taught at Leningrad State University after a lapse in his active teaching career of almost 25 years since he left Tomsk University (1931). In his later years he participated in a number of national and international conferences and committees, including the 8th International Botanical Congress in Paris (1954). For nearly 20 years he had been a vice president of the Botanical Society of the USSR, and at the time of his death he was serving as the Soviet representative on the Council of the International Association for Plant Taxonomy.

Schischkin's death was a grave loss not only to Soviet botanists but to botanists the world over. Bobrov wrote (14, p. 276):

He was wise, with extensive knowledge and experience in research-

work. He was respected and loved by all who knew him, always ready to help anyone who sought his advice.

At the Botanical Institute . . . B. K. Schischkin successfully continued the traditional investigations of the flora of our country that made this oldest botanical Institution renowned throughout the world. All his colleagues regret that he did not survive until the 250th anniversary of the Institute . . .

V. F. Kuprevicz

In 1949, V. F. Kuprevicz (1897-) succeeded Schischkin as director of the Institute; however, he served in this post only until 1952 because of his election as president of the Academy of Sciences of the Byelorussian Republic in 1951. Kuprevicz is a distinguished mycologist and phytopathologist, who worked with Tranzschel on rust fungi. Since Tranzschel's death in World War II Kuprevicz has carried on Tranzschel's efforts to prepare a "Flora of the Rust Fungi of the USSR." The first part of this "Flora" appeared in 1957. Kuprevicz is especially interested in the theoretical question of a species concept among the fungi and has published a number of papers on this subject. He also has published on the physiology of diseased plants (8). Not much is recorded concerning his accomplishments as director. At present (1967) he is one of the Soviet Union's most prominent botanists, editor-in-chief of *Botanichesky Zhurnal*, and a corresponding member of the Soviet Academy of Sciences.

P. A. Baranov

In 1952, Prof. Pavel A. Baranov (1892-1962)²⁷ was named director of the Botanical Institute by the Soviet Acad-

²⁷The biographical information about Baranov is drawn largely from Vassilczenko's obituary of him (15).

emy of Sciences, and upon assuming this post he entered a new and final period in his already illustrious scientific career. Born in Moscow in 1892, he was trained at Moscow University in the morphology and anatomy of plants. His earliest researches concerned the embryology of the Orchidaceae. In 1920, Lenin signed the bill establishing Tashkent University, and Baranov was among a group of scientists asked to help organize the University. Altogether, he devoted nearly 25 years of his life to a study of Middle Asian plants in connection with his position at the University, where he founded a program in botany and later (1928) became full professor and head of the Faculty of Morphology and Anatomy. In 1936, he was named the first director of the newly founded Pamir Biological Station (Tadzhikistan Republic, Middle Asia) devoted to problems of high mountain agriculture, and the Pamir work remained close to his heart up to the time he died—long after he vacated this post. In 1940, he was named director of the Botanical Institute of the Uzbekistan Branch of the Soviet Academy of Sciences. Three years later he was elected a corresponding member of the Soviet Academy of Sciences, and following this event Baranov moved to the Principal Botanic Garden of the USSR in Moscow, where he became acting director. In 1949, he was asked by the Presidium of the Soviet Academy of Sciences to direct the work of its Moldavian Branch. These latter two posts were held simultaneously, and he continued to hold them even after being named director of the Komarov Botanical Institute in 1952.

Although trained in morphology and anatomy, Baranov's interests and researches were wide-ranging and often strongly oriented toward agriculture and the Soviet economy. During his lifetime he published more than 200 scientific papers covering such diverse subjects as orchid embryology, viticulture, plant acclimatization, polyploidy, evolution of cultivated

plants, and the history of botany. One of his most important works is the book entitled "The History of Plant Embryology," published in 1955. His research specialty came closest to what might be termed "agricultural botany," but it would be hard to confine. While at the Principal Botanic Garden in Moscow he took a strong interest in the development of greenhouse collections especially from southern latitudes, and during his directorship in Leningrad he was affiliated with the staff of the Institute's Botanic Garden, where his specialty was considered to be plant embryology (16). In Moscow he had organized a Laboratory of Morphology and Anatomy at the Botanic Garden. It is probably fair to say that his embryological, anatomical, and morphological researches were largely applied in nature and not directed primarily toward the development of theoretical science. Thus he is not known abroad for fundamental contributions to plant embryology, morphology, or anatomy. During his directorship at the Komarov Institute he devoted considerable attention to the work of floristics and systematics that was going on in the vascular and cryptogamic herbaria and became involved in a number of important field expeditions. Noteworthy in this respect were his expedition to tropical West Africa (1954, see below) and his expeditions to tropical China (1958) and Viet-Nam (1961-62), when he made a special effort to send back seeds and other propagules of tropical species for the greenhouse collections.

Baranov, a capable leader and administrator, spent most of his life administering agricultural and scientific organizations for the Soviet Government, often under the auspices of the Soviet Academy of Sciences or one of its branches. Thus, perhaps his greatest contribution to science came in the area of science administration. During his later years, particularly, he served on many scientific committees and councils and

attended numerous conferences in one capacity or another. Frequently his responsibilities took him abroad. He was part of a delegation of Soviet botanists to the 7th International Botanical Congress in Stockholm in 1950, led by V. N. Sukaczev, and to the 8th Congress in Paris in 1954, led by A. L. Kursanov, where he was a vice chairman of the Ethnobotany Section. In 1958 and 1961 he visited Peking at the invitation of the Academy of Sciences of "Red" China, and in 1961 he also went to Italy. This was only the year before his death. After the Paris Congress he succeeded in having the canceled post-Congress excursion to tropical West Africa reinstated for his delegation, and they were led on an almost exclusively Russian, month-long tour of French Guinea and neighboring regions. A Swiss acquaintance of mine who also participated in this tour and learned to know some of the members of the Soviet delegation quite well came away much impressed by Professor Baranov, describing him as a wise and sincere man. Later, Baranov published an extensive account of this trip ("In Tropical Africa," 1956).

As director of the Komarov Botanical Institute, Baranov was faced with an outmoded patchwork of administrative structure that had gradually developed through the years to accommodate new disciplines and programs as they were added one by one. By now departments, laboratories, and *ad hoc* program teams were all blended into such an intricate organizational labyrinth that lines of authority were confused, and the various administrative units no longer were receiving their proper representation with respect to their relative significance in the total program of the Institute. Therefore, Baranov set complete administrative reorganization as a primary goal, which he achieved in 1960 only 2 years before his death and about 8 years after he became director. The 1960 reorganization was without doubt the single most important

achievement of Baranov's directorship. It is outlined briefly in a later section of this paper (see p. 119).

Baranov died in May 1962 at the age of 70 after a prolonged illness, having remained director of the Institute up to this time. Vassilczenko, in his tribute to him (15), described Baranov as a man of boundless energy, youthful agility and strength, inexhaustible scientific enthusiasm, and perennial optimism. Although one might have disagreed from time to time with his views, one could never have accused him of lacking scientific integrity or patriotism either to the cause of science or to his country, Vassilczenko said. During his lifetime Baranov was awarded many honors and medals including the Order of Lenin and the Order of the Red Star. He became a member of the Communist Party in 1941.

Al. A. Fëdorov

Following the death of Baranov, Prof. Aleksandr A. Fëdorov (1906-), corresponding member of the Academy of Sciences, was appointed director of the Institute, and continues to serve in this post today. Fëdorov is a morphologist and economic botanist who has participated in the work of the Department of Plant Resources almost from its inception in 1934. Through the years he has been one of the department's principal investigators and has led many important prospecting expeditions into western and central Asia, searching for plant raw materials. In 1959 he succeeded M. M. Iljin as head of this department, and at present he is also in charge of its Laboratory of Plant Resources, which deals with the botanical aspects of economic plants.

Fëdorov's specialties include also the systematics of the Mimosaceae, teratology, and the terminology of descriptive morphology. Concerned with the subjectivity of botanical ter-

minology in the Russian language, he with two of his colleagues undertook to compile an authoritative, illustrated manual that would standardize usage and put Russian botanical terminology on a thoroughly scientific basis. In 1956, the first volume of this work, "An Atlas on Descriptive Morphology—The Leaf" by Al. A. Fëdorov, M. E. Kirpicznikov, and Z. T. Artushenko, appeared; the second volume on the "Stem and Root" came out in 1962. Both volumes were edited by Director Baranov, who noted in the editor's preface to volume 1 that this work is the first of its kind in the Russian language; altogether he promised three volumes, the third and last to cover the "Flower and Fruit." Each volume is divided into two parts. The first part gives definitions, diagrams, and Latin equivalents for the Russian terms, and the second part consists of illustrative photographs of actual plant materials, keyed to explanatory legends. To the foreign botanist who must deal with Russian botanical literature the most helpful features are the Russian-Latin and the Latin-Russian dictionaries at the back of each volume. These are indispensable for interpreting the descriptive text of a Russian "Flora" like *Flora SSSR*.

The task of administering the multifaceted activities of the Komarov Botanical Institute today is a very demanding and complex one. During his tenure so far, Director Fëdorov has attempted to continue the expansion of the Institute's international as well as national roles in botanical research, following the good example set by the former directors.

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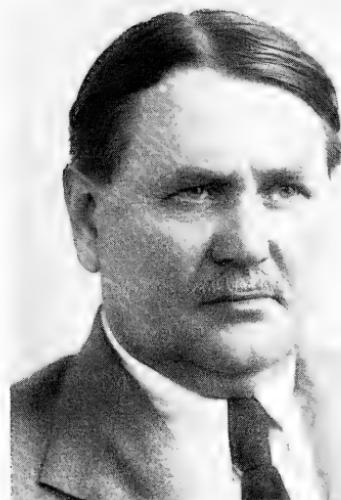
In summary, the directors of the Komarov Botanical Institute since its creation in 1931 have been the following: B. A. Keller (1931–36), J. D. Zinslerling and E. G. Bobrov (1936–38, acting directors), B. K. Schischkin (1938–49), V. F. Kuprevicz (1949–52), P. A. Baranov (1952–62), and Al. A. Fëdorov (1962–).



Борис А. Келлер
Boris A. Keller (1874-1945), geo-
botanist-ecologist, Director 1931-
36.



Борис К. Шишкин
Boris K. Schischkin (1886-1963),
taxonomist, Director 1938-49.



В. Ф. Купревич
V. F. Kuprevich (1897-), my-
cologist-phytopathologist, Di-
rector 1949-52.



Павел А. Баранов
Pavel A. Baranov (1892-1962),
embryologist and agricultural
botanist, Director 1952-62.



Courtesy Komarov Botanical Institute

Александр А. Федоров
Aleksandr A. Fëdorov (1906-), morphologist
and economic botanist, Director 1962- .

DEPARTMENTAL GROWTH AND ACTIVITIES

The formation of the Botanical Institute in 1931 signaled the beginning of intensive new researches on a broad scale in botany, agriculture, and horticulture. From the outset, the Institute has carried on theoretical and applied researches side by side; however, it must be said that a high proportion of the research program, including much quasi-theoretical work, has been geared very closely to the needs of the Soviet economy and directed more toward rapid development of scientific technology than toward the pursuit of pure science. Like all Soviet institutions, the Institute has been called upon to participate in the Government's long-term economic planning ("Five-Year Plans"), which has required the setting of long-term research goals. This requirement has led to a strong emphasis on carefully programmed research (see "National Role," p. 131).

The principal goals in planning have been to inventory the natural plant resources of the vast territory of the Soviet Union and to discover ways of utilizing these resources in agriculture and industry. As a result, botanical exploration and prospecting, involving numerous expeditions, have been a major pre-occupation of nearly all departments of the Institute since its founding but especially during the 1930s and 1940s. Thus, through the years the activities of the Institute have been very nationally oriented, and only in the postwar years has it been possible for botanists at the Institute to devote some of their energies to tropical exploration abroad.

Altogether, the numerous research and development activities of the Institute cover such a large scope that one cannot characterize them easily, and it would be impossible and pointless to catalog all these activities here. The Komarov Institute has no real counterpart among American institutions. Actual-

ly it combines in one grand amalgam programs and functions that in the United States would be found in the Smithsonian Institution, the U. S. Geological Survey, the National Arboretum, and the Agricultural Research Service (latter two of the U. S. Department of Agriculture). Lebedev *et al.* (2, p. 41) summarize the whole gamut of activities by saying that the Institute is devoted to research on floras and vegetation and their history, development, utilization, restoration, and enrichment by introduction. This general task is being pursued in "four principal directions: 1) the flora of the U.S.S.R. and its utilization; 2) vegetational cover of the U.S.S.R.; 3) adaptation of plants to environment under conditions of introduction and acclimatization; 4) the evolution of the Plant Kingdom."

In the following pages I have attempted to give only a few highlights of departmental growth and activities through the years.

Prewar Years (1931-41)

The story of the Komarov Institute is largely the story of its **Department of Vascular (Higher) Plants**, which, as already indicated, has always been the biggest and most important department of the Institute and has on the whole continued to make the most significant contributions to science. To be sure, some of the other departments have also made significant contributions, especially in recent years, and their relative significance in the Institute is steadily growing today; however, the Department of Vascular Plants still overshadows all other divisions of the Institute at least internationally. The significance of this department stems from the fact that it presides over one of the oldest, largest, and most valuable herbaria in the world—certainly one of the *two* paramount

resources of the Institute, the other being its rich botanical library—and also from the fact that its botanists have consistently pursued a vigorous and scholarly investigation of the flora and vegetation of the USSR. Considering the enormous territory embraced by modern Soviet borders and the fact that it includes the lion's share of the north temperate landmass, this makes the Leningrad output very critical in the world literature of systematic botany.

One of V. L. Komarov's first acts as head of the department was to mobilize his staff for the colossal task of preparing a multivolumed treatise on all the vascular plants of the USSR. This work was to be called *Flora SSSR*. The groundwork for it had been laid even before the merger was completed, and by late spring of 1932 the writing began. From this moment forward the story of the department was written by the progress of this almost unthinkable project. During the prewar period the department mounted a large number of expeditions into all parts of the Soviet Union to collect the native flora and thereby the documentation for writing *Flora SSSR*. This collecting and writing occupied the energies of a majority of the staff. Nevertheless, other systematic-floristic researches, stimulated in large part by the *Flora* Project, did go forward at the same time, and during these years many revisions, monographs, and local floras also were published. Because of its signal contribution to botanical literature and its central role not only in the life of the department but of the entire Institute for the 30-year duration, the *Flora* Project is discussed by itself in a special section (see p. 136).

When the herbaria of the Principal Botanic Garden and the Botanical Museum were merged into the new Department of Systematics and Geography of Vascular Plants (usually simplified to Department of Vascular Plants), the combined staff included Fedtschenko, Komarov, and Schischkin, three

“heavyweights” of Russian taxonomy in this century. The former two, already advanced in age (60 and 63 years old, respectively) and widely recognized as “elder statesmen” of taxonomy, were nonetheless still very active and continued vigorous programs during the 1930s and early 1940s. Schischkin, at 46, was only entering his prime. Schischkin came to the department from the former Museum, while Fedtschenko had been the chief botanist in the Garden’s herbarium. Academician Komarov’s principal activities had been at the Garden, although at the time of the merger he was serving as director of the Museum. After the merger, he became head of the department, and Fedtschenko and Schischkin became senior botanists.

Fedtschenko carried on heavy editing responsibilities in the new department along with much writing and publication of his own, but he never became involved in administrative affairs as did his eminent, elder colleague, Komarov. Among his many publications during the 1930s should be mentioned his contributions to about a half-dozen volumes of *Flora SSSR* and his editorship of the 6th edition (1933), of P. F. Maevsky’s “Flora of Middle Russia” (1933).²⁸ Fedtschenko died in 1947 and his last contribution to *Flora SSSR* was published posthumously in 1948.

VLADIMIR L. KOMAROV

Vladimir L. Komarov²⁹ is by all odds the most celebrated Russian botanist of the present century, and a brief digression

²⁸Edition 1 by Maevsky, 1892.

Ed. 2, edited by S. I. Korshinsky, 1895.

Ed. 3, edited by B. A. Fedtschenko, 1902.

Eds. 4, 5, edited by D. I. Litvinow, 1912, 1917.

Ed. 6, edited by Fedtschenko, 1933.

Ed. 7, edited by V. L. Komarov, 1940.

Eds. 8, 9, edited by B. K. Schischkin, 1954, 1964. Latest edition is called “Flora of the Middle Zone of the European Part of the USSR.”

²⁹Account of Komarov is based on references 2, 4, 5, 7, 8, 9, 10, 17, 18, 19, 20.

to consider his contributions is in order here. (His taxonomic philosophy is discussed at some length in the section on *Flora SSSR*, p. 149.) Born in 1869, he died in December 1945 at the advanced age of 76 after a long, serious illness. At the time of his death he was president of the Academy of Sciences of the USSR. He was also president of the All-Union Botanical Society and editor-in-chief of *Botanichesky Zhurnal SSSR* ("Botanical Journal of the USSR"), both of which he helped to found (pp. 53 and 169). He had served on the journal's editorial board since the founding in 1916. Thus, Academician Komarov had been accorded not only the highest honors and responsibilities in Soviet botany but also in all Soviet science. He had truly reached the pinnacle of scientific scholarship and public esteem in Soviet society. As a tribute in his 75th year, the associate editors dedicated an issue of *Botanichesky Zhurnal SSSR* (1944, No. 5) to him, lauding him as an "outstanding botanist-public servant" and concluding their brief résumé of his years of service with these words (17, p. 150):

Let us wish him health, strength, and good spirit from the bottom of the heart for leadership through the long years of Soviet science, and botany in particular, of the great Stalin epoch. (Translation mine.)

Komarov, who had studied under that "father" and patron saint of Russian botany, Beketov, began his scientific activities around 1892, and thus his career spanned the closing years of the 19th century and the first half of the 20th. His early years were spent at the Imperial Botanic Garden where in 1902 he became the head of the Department of Living Plants after the departure of V. I. Lipsky, and by 1917 he was already deputy director of the Garden under Isatchenko. These were productive years when he carried out a series of very important expeditions and published such pioneer works as his 3-

volume "Flora of Manchuria" (1901–07) and "Introduction to the Floras of Mongolia and China" (1908–09), which was his doctoral dissertation. At the beginning of the century he was the principal investigator of Central Asian plants at the Garden. Among his many other papers and monographs published at this time was a teaching syllabus on medicinal plants (1915). In 1920, Komarov was elected to the Academy of Sciences to fill the chair of plant systematics, vacant since the death of Korshinsky (1900). It was during this period that he published his "Flora of Kamtchatka," and in 1930 he succeeded Borodin as director of the Botanical Museum, serving for the brief interim before the merger (see pp. 40, 50).

By the time of the merger Komarov's most productive years as a research scientist were behind him, and he soon entered a new phase in his life, as editor, organizer, science administrator and propagandist, and public servant. In his new post as head of the Department of Vascular Plants he organized the *Flora SSSR* Project, which, as editor-in-chief, he dominated until his death, although he himself was not a major contributor. The brunt of the work of organizing and managing the Project fell on B. K. Schischkin and E. G. Bobrov almost from the start (see special section on *Flora*, p. 137). Komarov's responsibilities in the Academy began to take him to Moscow as early as 1934, when the headquarters of the Academy of Sciences were transferred to Moscow (20), and kept him there most of the rest of his years. However, he maintained an apartment in Leningrad on the Institute grounds until 1941 and used to come to the Institute often (Al. Fëdorov, correspondence 1966). In 1936, he became president of the Academy.

For all practical purposes, therefore, the responsibility for running the Department of Vascular Plants fell on Schischkin almost from the outset of Komarov's chairmanship, although Komarov held onto the official title until his death, undoubted-

ly because of the rigid hierarchy of the Academy which placed Komarov, as an academician, above Schischkin who only later was taken into the Academy.

Thus, while Komarov, in his capacity as editor and by authority of his several official positions in the Institute and Academy, continued throughout his life to exert an enormous philosophical and ideological influence upon the research activities of the Institute and more particularly the Department of Vascular Plants, his role in the *everyday* scientific activity of the Institute was slight. This fact does not downgrade his contribution to the Botanical Institute, to Soviet botany, or to botany everywhere, but it does emphasize the fact that many other diligent scholars at the Institute carried the main burden of much of the taxonomic and other research for which Komarov carried the banner. Yet to Komarov's everlasting credit, for his vision and genius as organizer and guiding force, must go the success of the now completed *Flora SSSR*. Though his role in later years, especially after he became president of the Academy, was more like that of a patron than a project leader and his authorship and editorship were by times more spiritual than literal, Komarov will doubtless always be remembered as father and author of this monumental work.

As a botanical scholar, Komarov specialized chiefly in the taxonomy and geography of vascular plants especially of Central and Eastern Asia, but he also was interested in many other branches of botany and published on many topics. In the course of his scientific career, first at the Botanic Garden, then also at the Botanical Museum, and finally in the Botanical Institute, he took some part in the activities of virtually every department of these institutions. He had a lifelong interest in theoretical questions, as seen already in his introduction to the "Flora of Manchuria" (1901), but he turned much more attention to these matters in his later years. His views were summed up

in 1940 in a paper entitled, "The Concept of Species in Plants," which is often quoted in Russian sources and brought him the Stalin Prize. Botanical historian Lipschitz (19) stresses Komarov's concept and extensive use of the category of "series" in plant taxonomy. Komarov is also credited generally by Russian botanists as having introduced and popularized in their taxonomic research the concept of the geographic race as the real species unit (17). To many botanists, Russian as well as foreign, however, Komarov was a taxonomic "splitter" (cf. section on "*Flora SSSR*," p. 149, for further discussion of his species concept). A selection of Komarov's voluminous scientific writings was published after his death, and together they give one a portrait of the scientist and the man (*Opera Selecta*, Academy of Sciences of the USSR, Leningrad-Moscow. 12 vols. 1945-58. In Russian).

Like other Institute personnel, Komarov took an active leadership role in paramilitary botanical activities during World War II and subsequently was decorated by Stalin, along with coworkers, for his wartime efforts as chairman of the "Commission on Mobilization of Resources of the Urals, Siberia, and Kazakhstan."

Komarov was also a professor and taught for many years at Leningrad State University and other institutions of higher learning in the city. At the Botanical Institute he advised many graduate students, and from this reservoir of taxonomists came the majority as well as the most active of the authors who worked on *Flora SSSR*. Thus, besides his own personal philosophy of taxonomy which he injected into his writing and editing, his greatest contribution to the *Flora* Project was a cadre of students trained in his own methods. Throughout his life he played a large role in the dissemination of botanical knowledge both on the popular and scholarly levels. During his early years at the Principal Botanic Garden, where he

managed the greenhouse-arboretum complex (Department of Living Plants) from 1917 to 1931, he took a special interest in public education and initiated the first organized tours through the park and greenhouses about 1918. Up until the time of the Revolution, V. I. Lipsky, the noted historian of the Imperial Botanic Garden, had been in charge of the Department of Living Plants (7, Sokolov *in* 8, 9).

* * *

Returning to the work of the department, we should take note of several other developments and activities during the prewar period. Deserving special mention among the numerous researches under way that culminated in important publications are the researches of the well-known Gramineae specialists, R. U. Roshevitz and S. A. Nevsky, whose work continued the long tradition in this specialty started in the early 19th century by Trinius; the long-term experimental studies of S. V. Juzepczuk on *Alchemilla* and other genera, being carried out since the 1920s in the greenhouse and outdoor plot facilities first set aside for experimental taxonomy by Komarov in 1918 while he was in charge of the Department of Living Plants at the Principal Botanic Garden; and the large-scale experimental taxonomic work of I. T. Vassilczenko on the seedlings of plants, especially monocotyledons (Schischkin *in* 8). In 1937, L. A. Kuprianova began work in the department on pollen morphology and, according to Schischkin (8), she soon emerged as the leading palynologist in the whole Soviet Union. Her well-known work "Morphology of the Pollen of Monocotyledonous Plants," was published in 1948.

The Department of Cryptogamic Plants embraced the algae, fungi, lichens, and bryophytes, but excluded ferns and bacteria. The ferns were covered by the Department of Vascular Plants, and the bacteria were excluded as belonging to the

province of microbiology. The department was placed under the direction of lichenologist V. P. Savicz (1885–) who remained its head almost to the present time. The cryptogamic specialists could not yet foresee the preparation of a cryptogamic work analogous in scope to *Flora SSSR*, because of the great need for fundamental revisions and monographs. Consequently, the department set as its main task the preparation of such basic works which could point the way toward a "Cryptogamic Flora of the USSR." Noteworthy in this connection are several monographs published by outstanding members of the staff at this time. A. A. Elenkin published two volumes of his ambitious "Cyanophyta of the USSR" (1936, 1938); L. I. Savicz-Lubitskaya published her "Sphagnum Mosses of the European Part of the USSR" (1936); and V. G. Tranzschel published the "Rust Fungi of the USSR" (1939). At 81, the prolific bryologist Savicz-Lubitskaya continues to publish papers today. During the prewar period a certain amount of physiological and genetical research on lower plants was begun (2, Savicz in 8).

The **Department of Geobotany** was first organized in 1922 at the Principal Botanic Garden by N. I. Kuznetsov (1864–1932) who remained head of this department until his death in 1932, shortly after the formation of the Botanical Institute. He was succeeded for a brief period by V. N. Sukaczev (1880–1967), and in 1934 J. D. Zinserling became head, serving until 1938; E. M. Lavrenko (1900–) took over in 1938 and served until very recently (3; 8, p. 144). Kuznetsov became a leading figure of this century among Russian geobotanists, and his distinguished successors likewise have made important contributions to this discipline. Sukaczev was elected to the Academy in 1943 (20). Although the science of geobotany was formally recognized at the Garden only in 1922, its roots go far back in St. Petersburg botany, and

through the years, thanks especially to the establishment of the Botanical Institute, it has become one of the most highly developed botanical sciences in the Soviet Union. In fact, it is fair to say that geobotany is one science in which the Soviets hold a measure of world leadership today.

“Geobotany” is a European term that has never been widely used in American botanical circles, and it is difficult to define precisely with respect to our own traditional botanical disciplines. Actually geobotany hardly qualifies as a *single* well-circumscribed discipline. Rather, it can embrace some or all aspects of phytogeography, phytosociology, ecology, paleobotany, agronomy, geology, botanical cartography, plant resource exploration and prospecting (e.g., “biogeochemical” prospecting), land reclamation and utilization, and the history of vegetation. In the Russian context, where the term has long been used and, presumably, precisely understood, geobotany refers to the general study of *vegetation*—its origin, development, distribution, and utilization (especially)—in contrast to the study of plants and floras, which falls into the province of taxonomy and floristics. Ecology, which in the American sense usually includes community ecology (phytosociology), in the Russian sense usually refers to autecology or physiological and experimental ecology, excluding phytosociology (called phytocoenology in most Russian sources) which then falls into geobotany.

Great stress has been laid upon the economic benefits of geobotanical research by the Institute, and its numerous geobotanical expeditions and programs have all had strong practical overtones. In this connection, Lebedev *et al.* write:

The work of the Department of Geobotany is closely connected with the requirements of our national economy. Almost all the basic research work of this Department is planned in accordance with the tasks, set by the Government. (2, pp. 31-32)

Much of the extensive geobotanical work of the Institute has been little more than the mechanical surveying and mapping of plant resources, and the theoretical research content has not always been especially high. The Department of Plant Resources also has carried out much survey work, and often the programs of these two departments have overlapped rather strongly so that it is not easy, at least for the outsider, to draw a sharp line between their respective roles in the total work of the Institute. It should also be noted here that many of the Institute's geobotanical expeditions through the years have been financed partly by the Academy's "Council for the Investigation of Natural Resources" (2).

This very practical orientation has been characteristic of all Soviet geobotanical research, and the big dividend today is the virtual world leadership that the Soviet Union holds in the science and technology of biogeochemical prospecting—i.e., prospecting for underground mineral and chemical deposits by means of plant indicators—and botanical cartography. Through the years, Soviet geobotanists have produced a fine series of geobotanical maps of various types, covering the USSR and many of its regions. Even today the United States has no real equivalents for many of these maps or a comparable program in biogeochemical exploration or botanical cartography, although the U. S. Geological Survey has been active to some degree in both areas. The Komarov Botanical Institute has made very significant contributions toward the total Soviet program. Already in 1937, it had prepared a small-scale (1:15,000,000) geobotanical map under the supervision of A. P. Iljinsky for the Soviet "World Atlas," entitled, "Map of the Vegetation of the USSR." A large-scale edition of this map (1:5,000,000) was issued in 1939 in four sheets under the editorship of Lavrenko. In 1940 the Government charged the Department of Geobotany with the task of

dividing the entire Soviet Union into geobotanical sectors, but this task was not completed until after the war. During the 1930s several methodological works were published, and the manual "Vegetation of the USSR" was started. Two volumes appeared (1938, 1940) but the manual was never completed (2).

In addition to the botanists of the department whose names have already been mentioned, B. N. Gorodkov calls for special noting. He was an eminent arctic geobotanist and explorer at the Botanical Museum before the merger, and at the Institute he continued his work and took a big part in helping to develop a strong tradition in arctic botany.

The **Department of Experimental Botany** (2) carried out work on the physiology of photosynthesis and photoperiodism aimed particularly at the general question of plant adaptation to light. Other questions under investigation in the prewar years were the physiology of drought resistance, ecological anatomy, and the role of trace elements. V. N. Lubimenko (1873–1937), head, was succeeded at his death by V. A. Brilliant (1888–1954) who reorganized the department in 1938, renaming it the Department of Ecology and Physiology. The work of this department was agriculturally oriented, and altogether its contributions to theoretical botany during the 1930s were not particularly significant. From an outside viewpoint, therefore, the physiological and experimental researches of the Institute at this time do not represent one of the brighter pages in its early history. They are significant, however, from the viewpoint of the overall growth and development of the Institute because they did provide a base on which to develop much stronger experimental studies later.

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The departments discussed so far are those that have held the greatest significance for international botanical circles. The

remaining prewar departments—Living Plants, Plant Raw Materials, and the Museum—have had their greatest significance on the national scene. This is particularly true of the Department of Plant Raw Materials whose program through the years probably has been geared the most closely of all the departments to the demands of Soviet economic planning. Likewise, the Museum's chief function has been public education. Accordingly, much detail concerning these departments will be omitted in the following résumés.

The **Department of Plant Raw Materials and Botanical Prospecting**, as it was formally titled, was founded in 1934 under the leadership of B. N. Klopotov (1882–1942). He was succeeded by M. M. Iljin (1889–) in 1938, and after 1944 the department became known simply as the Department of Plant Resources. Its work down to the present time can be summarized as plant exploration, introduction, and utilization, and it has employed both economic botanists, concerned with the theory or “botany” of plant utilization, and botanical-agricultural technologists of various sorts. In the latter connection should be mentioned the establishment of a plant chemistry laboratory in the department for elaborating the chemical structure of important plant substances (p. 116). The principal activities of the department during the prewar years are characterized very well by Lebedev *et al.*:

Numerous expeditions were organized for prospecting for new sources of plant raw materials: new oil-seed plants, new textile-fiber plants, brush-fiber, filling-fiber, plaiting and rough-weaving fiber plants, new useful ligneous plants, new drug-plants (both medicinal and insecticidal), in particular, alkaloid plants, new essential-oil, gum and resin plants. (2, p. 22)

Iljin's own researches covered various problems in economic botany and the phylogeny of plants. During his tenure (1938–59) he was responsible for convening three national symposia on the topic of phylogeny (2). Altogether, this was an extreme-

ly active department during the 1930s and in the eyes of the Government probably the most important department at the Institute.

Shortly after the merger, the Department of Living Plants was renamed the **Department of the Botanic Garden**, called, simply, the Botanic Garden. The department had jurisdiction over the greenhouse-conservatory complex and all the outdoor nurseries and plantings, but lacked jurisdiction over all the remaining units (e.g., herbarium) of the former Principal (Imperial) Botanic Garden. Thus the Institute's Botanic Garden was a botanic garden in the true sense. For a time it continued to rank as the *Principal* Botanic Garden of the USSR, as its predecessor, but today the *Principal* Botanic Garden is located in Moscow, and the Leningrad Garden is known only as the Botanic Garden of the Komarov Botanical Institute (16).

The Department of the Botanic Garden was headed by A. P. Iljinsky (1888–1945) only until 1934 when N. V. Shipchinsky (1886–1955) became head. Shipchinsky was succeeded in 1938 by S. J. Sokolov, who relinquished this post to Shipchinsky again in 1942 because of being evacuated for duties in Kazan. Shipchinsky remained in besieged Leningrad. In 1948, Sokolov once again returned to the post of head of the department. (For postwar heads, see footnote on p. 116.)

Research in the Botanic Garden (7,11,12) during the first years was concerned primarily with the taxonomy and geography of plants and complemented the work going on in the Department of Vascular Plants. The Garden staff, helped by personnel in other departments, built up one of the richest indoor collections of tropical and subtropical plants in the world. Besides these plants, many regional groups were established both indoors and outdoors. The outdoor nurseries, gardens, and park were used in an extensive program of plant

introduction and acclimatization, and after 1938 the staff efforts were largely turned to this work. Under the new leadership, the department was charged with the task of elucidating the theoretical basis of acclimatization. Also, the staff was called upon to investigate problems of ornamental and agricultural gardening.

Altogether, the staff of the Botanic Garden had nearly 800 species of woody plants and 4000 species of perennial and annual herbs under cultivation outdoors by 1941, despite hard winters in 1938, 1939, and 1940. This was no mean feat for a botanic garden that lies 500–600 miles north of similar gardens in the United States and Canada. The gardens in Scandinavia that lie at about the same latitude as Leningrad are subject to a milder climate because of the Gulf Stream. Except for the "Polar-Alpine Botanic Garden" on the Kola Peninsula north of Leningrad, there is no garden in the world that is subject to more severe environmental conditions than the Komarov Botanic Garden. Because so much of the Soviet Union, like Canada, lies at high latitudes, this Garden has played a very important role through the years in the introduction of ornamental trees and shrubs and other useful plants into Soviet cultivation and trade.

In addition to its own programs the Botanic Garden has functioned in a supporting capacity for all the other departments of the Institute, and it has carried a large share of the public education responsibility (also see p. 135).

From the date of its official founding in 1823, the Imperial Botanic Garden had its own Museum where collections and various objects that did not fall explicitly into the province of any other department were housed and, sometimes, studied (Polyansky *in 8, 13, 21*). In a sense, this Museum was a catch-basket department, and from time to time new laboratories and departments were split off from it and the pertinent



Александр А. Гроссгейм
Aleksandr A. Grossheim
(1888-1948), taxonomist.



Александр А. Еленкин
Aleksandr A. Elenkin
(1873-1942), cryptogamic
botanist.



Алексей П. Ильинский
Aleksei P. Iljinsky (1888-
1945), phytogeographer.



Африкан Н. Криштофович
Afrikhan N. Krishtofovich
(1885-1953), paleobotanist.



Николай И. Кузнецов
Nikolai I. Kuznetsov (1864-
1932), geobotanist.



Владимир Н. Любименко
Vladimir N. Lubimenko
(1873-1937), physiologist.



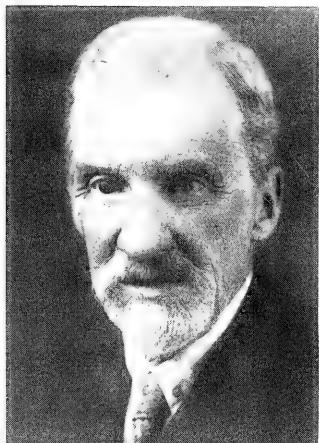
Николай А. Монтеverде
Nikolai A. Monteverde
(1856-1929), physiologist.



Иван В. Палибин
Ivan V. Palibin (1872-
1949), paleobotanist.



Courtesy Smithsonian Institution
Роман Ю. Рожевиц
Roman U. Roshevitz (1882-
1949), agrostologist.



Вольдемар Г. (А.) Траншель
Voldemar G. (A.) Tranzschel (1868-1942), mycologist.



Сергей В. Юзепчук
Sergei V. Juzepczuk (1893-
1959), taxonomist.



From Baranov and Bobrov (8)

Борис А. Федченко
Boris A. Fedtschenko (1872-1947), taxonomist.



Courtesy Komarov Botanical Institute

Виктор П. Бочанцев

Victor P. Botchantsev (1910-), examining specimens in Middle Asian Section of herbarium, 1958.

collections were transferred to the new unit. It also had some kind of public exhibits for many years. Two of the main research functions of the Garden's Museum during the pre-Institute years of this century, especially since the Revolution, were the study of paleobotany and the study of plant raw materials and products. Throughout the Garden's long history, all fossil plant collections had been housed here. In 1934, the new Department of Plant Raw Materials and Botanical Prospecting was created on the basis of resources in the Museum, and a group of the Museum's scientific staff and a significant block of the collections were transferred to this new department. (These collections were returned to the Museum in 1940.) The experimental plant products laboratory was also transferred out of the Museum, and about 1934 the paleobotanical collections were transferred to the Department of Vascular Plants (p. 105). As a result of these moves during the early years of the new Botanical Institute, the research activities of the Museum were severely curtailed, and its space and facilities were significantly reduced.

The Institute's **Botanical Museum** now became little more than a public exhibition hall. Exhibits, developed gradually over a period of many years, were built largely around actual plant materials or products. By 1931 the exhibits were in sad condition and badly out of date, and in 1933 Sukaczev headed up a new effort to redo them. The Museum was closed to the public for 4 years, and during this time most of the older exhibits, based on the Museum's valuable collections, were withdrawn or greatly reduced. They were replaced by new placard exhibits pitched to the secondary school level. These had three themes: (1) "The Vegetation of the Soviet Union as a Natural Resource," (2) "The History of the Plant Kingdom," and (3) "The Work of the Botanical Institute." Thus, the Museum ceased to serve as a scientific department of the

Institute, and became instead a pedagogical resource for instructing secondary school students. Altogether, the 1930s were rather deplorable years for the Museum, according to Lebedev *et al.* (2, p. 23), who write concerning it: "Only after the World War II was it possible to proceed to the preparation of a new exposition that could meet the high scientific requirements of our time." Today, in addition to its educational exhibiting, the Museum again carries out certain scientific research activities in the Institute.

War Years (1941–44)

Within 2 years after the outbreak of World War II in Poland (1939) Hitler's armies had advanced eastward to the outskirts of Leningrad, where they set up the infamous 900-day blockade that brought great destruction to the city and ultimately involved virtually all of its citizens in bitter hostilities. The blockade period (1941–44) was an especially difficult and tragic time in the life of the Botanical Institute. At the outset of the war the scientific staff became scattered and the research activities at the Institute all but ceased. The majority of the staff were either enlisted in the Red Army for duty at the front or were evacuated to the east for paramilitary scientific activities. One group under Director Schischkin was evacuated to Kazan in the fall of 1941, just before the blockade tightened, where they engaged in a crash program for the development and utilization of plant resources for the war effort. In 1942, a group of geobotanists who had survived the first bitter winter of the blockade was evacuated to Moscow and charged specifically with the geobotanical mapping of western European USSR; they worked under the leadership of E. M. Lavrenko.

A small corps of the staff, headed by V. S. Sokolov (as dis-

tinguished from S. J. Sokolov, the evacuated head of Botanic Garden), remained in Leningrad and devoted itself primarily to the defense of the city. At the same time some urgent applied research, directed toward the war effort, was carried on at the Institute. Concerning this, Lebedev *et al.* write (2, pp. 24-25):

. . . particular attention was drawn to the mobilization of botanical knowledge to serve the needs of the front and of the population of the blockaded city. The workers of the Institute were elaborating new methods of land camouflage and improved methods of reading the serial air-photographs of stretches of woodland, tundra and bog, the methods of collecting and processing of *Sphagnum* for the production of antiseptics and medicinal preparations. They sought for new sources of vitamins, for medicinal plants, etc.

Even some pure research continued. Under the leadership of I. T. Vassilczenko, volume 11 of *Flora SSSR* was completed, and through the intercession of B. A. Tikhomirov enough paper was secured to print a limited edition late in the fall of 1941 when the population was already in an advanced state of starvation (2, 9). The preparation of other volumes also went forward. Bobrov (9) writes:

N. F. Goncharov, already desperately weakened by starvation, proceeded with the account of the genus *Astragalus* which made up Volume 12. Later that winter [1942] this account was defended as his thesis for the degree of doctor of biology, and in February 1942 Goncharov died of hunger.

Other graduate students continued their studies toward the candidate and doctorate degrees, and esoteric researches on cryptogamic plants proceeded. Despite everything, a new laboratory was even organized during this terrible time (p. 107).

In 1946 the Institute published a "Volume of Scientific Works Carried Out in Leningrad During the Course of the Three Years of the Great National War (1941-43)."

All but one of the 25 greenhouses were destroyed by bombs and shells during subzero weather, and the great majority of the valuable tropical and subtropical collections perished (7,

11). Only by the valiant efforts of individual workers, hungry and starving, were any of the indoor plantings saved. Some of the workers cared for specialized collections in their own apartments. One horticulturist saved the cactus collection by taking it home for the duration of the war. The outdoor plantings were also seriously damaged and depleted. Miraculously, the Herbarium-Library Building was not hit, and not a book or herbarium sheet was lost. One is amazed that the entire Institute was not completely leveled when one sees, as I was shown by Director Fëdorov, how close to the heart of the complex bombs fell, e.g., beside the Palm Conservatory. It is to the enormous good fortune of botany everywhere that the tragedy of the Berlin Herbarium was averted at Leningrad, especially because the Komarov Herbarium is the birthplace of so much Asian botany.

Many of the Institute's prewar scientific and other personnel did not survive the war, either having died of starvation during the blockade or having been killed in action at the front or in the defense of Leningrad. Among those lost during the war should be mentioned N. A. Busch, A. N. Danilov, N. F. Goncharov, A. A. Elenkin, J. A. Znamensky, B. N. Klopotov, V. I. Kreczetowicz, A. I. Leskov, V. P. Maleev, I. A. Ol, A. V. Prozorovsky, K. K. Shaparenko, V. G. Tranzschel, and A. V. Yarmolenko. Nearly all of the surviving Leningrad group were decorated after the war for bravery in defense of the city. (2, 3)

Postwar Years (1945–66)

In the spring of 1942, personnel at the Institute began the painful spadework of rebuilding the greenhouses and restoring the collections. "Seeds were sown, cuttings were planted, fern spores, collected from frozen plants, were sown" (2, p. 26). Not until 1944, however, did the first surviving evac-

uees begin returning to the Institute, after the German siege had been lifted and the front had advanced far to the west of Soviet borders. They returned to find most of the greenhouse complex leveled, the rich indoor and outdoor collections of living plants ravaged, and the remaining staff sadly depleted. Yet little time was lost fretting. Now the enormous task of rebuilding the facilities and resuming normal scientific activities could begin in earnest.

The task of rebuilding the greenhouses and conservatories went slowly at first because of the lack of resources in the immediate postwar period, and by the early 1950s only about a fourth of the complex had been reconstructed. Then in 1953 the Institute received an appropriation of 6.1 million rubles to complete the reconstruction. Within the next 3 years 18 houses were constructed, for a total of 24, bringing the greenhouse-conservatory complex back essentially to its pre-war status (25 houses). Today there are 27 houses, and the total area under glass is more than a hectare (about 2.5 acres).

The Museum also had been damaged extensively in the war, and it was closed to the public between 1945 and 1951 for restoration. The 1953 appropriation made it possible to build a brand new museum building during the late 1950s. It was built in the greenhouse quadrangle and took the place of one of the prewar houses (No. 5). With the completion of this new Museum in 1960 the postwar reconstruction phase came to a close. (2, 3, 7, Sokolov *in* 8, 13, correspondence with Al. A. Fëdorov, 1966)

The companion task of restoring the exotic collections, as already mentioned, began at once after the war. The Institute's expeditionary work was resumed in 1945, and in the years since expeditions have taken staff members into all parts of the USSR and to many foreign countries, including Brazil, China, Ethiopia, Ghana, Guinea, India, Indonesia, Mongolia, North

Viet-Nam, United Arab Republic, and various countries of Eastern and Western Europe. A principal objective on these trips has been to send back live plants and seeds for the Botanic Garden. In 1947, for example, four Institute botanists, including Schischkin and Juzepczuk, carried out a short expedition to Argentina and (mainly) Brazil and sent back 730 specimens (200 species) of live plants, as well as a small herbarium collection (2000 sheets). (Juzepczuk had been to Brazil in 1928 on a much longer expedition when he collected 10,000 herbarium specimens.) A rapidly growing seed exchange program also helped greatly to replenish the Institute's live collections.

The state of the live collections before and after the war can be appreciated best by examining some comparative figures. In the immediate prewar period, more than 6000 species were growing in the greenhouses, but by the winter of 1942 less than 1500 species, kept under various makeshift conditions, could be tallied. Today, the number is back up to 3500. The outdoor plantings dropped from a high of nearly 800 woody plants and 4000 herbs before the war to about 450 and 800, respectively, in 1943. Today, the numbers almost reach prewar levels. Replenishing the indoor collections has depended, naturally, on the greenhouse reconstruction program and on the scale of expeditionary work, especially in the tropics, and thus has taken time. Rebuilding the outdoor collections has also been slow and very difficult but for somewhat different reasons. Owing to the harsh climate, every progress seems to be followed by two setbacks. At any rate, now, some 20 years later, the Botanic Garden is finally beginning to reach and surpass its prewar status. (2, 3, 7, 8 11)

The tempo of scientific research and publication, resumed at the Institute in 1945, has steadily increased, especially since the 1950s. A whole series of new departments, laboratories,

and special programs have developed as the Institute has continued to expand its applied and theoretical research efforts in all directions. It would take a book to chronicle the significant events and record the important persons and contributions of the postwar period alone. Only the briefest sketch can be given here. First, the development and growth of new units in the Institute will be examined, and then the postwar activities of the traditional departments will be considered. The most recent events of the past several years must receive the lightest treatment of all because these years are essentially current history and their events have not yet been fully recorded by the Russians themselves.

NEW DEVELOPMENTS

A "Paleobotanical Laboratory (Section)" (2, 3, 13, 21) was organized in the Department of Vascular Plants during the thirties (ca. 1934) under the direction of I. V. Palibin (1872–1949). It was created from collections that previously were held in the Institute's Botanical Museum (p. 99) and was devoted primarily to the study of the Tertiary flora of the USSR. Although Palibin lived until 1949, he became incapacitated at the time of World War II, and his laboratory was set adrift until 1951 when the well-known Russian paleobotanist A. N. Krishtofovich (1885–1953), corresponding member of the Soviet Academy of Sciences, resurrected the laboratory and breathed new life into it. In 1952 the laboratory was elevated to the status of a separate department, which Krishtofovich continued to head until his death. Prof. A. L. Takhtajan (1910–), corresponding member of the Armenian Academy of Sciences, took over the department in 1954 and continues to serve as chief paleobotanist of the Institute to the present time, although P. I. Dorofeev and others are also conducting important paleobotanical research. When

the Institute was reorganized in 1960, the paleobotany group and collections again were subordinated to the Department of Vascular Plants, and since then Takhtajan has been head of the department as well as head of its Laboratory of Paleobotany (p. 121).

Iljinskaya *et al.* (21) describe the paleobotanical collections and activities of the laboratory in some detail, including a historical sketch. The collections include several thousand slides of leaf epidermises and about 2500 slides of fossil woods. Besides a large fossil fruit collection, they boast of having one of the largest coal ball collections in the world, which is highly unique. Studies of coal ball fossils are relatively recent here, having been conducted by Takhtajan and N. S. Snigirevskaya only since 1956.

This is the only paleobotanical department in the Soviet Union that is affiliated with a botanical rather than geological institution, and its staff is able to concentrate on theoretical problems of evolution and phylogeny instead of utilitarian problems of stratigraphy. Takhtajan's writings in morphology and evolution have been translated and widely read abroad so that today he is perhaps the best known living Russian botanist. Some of his best known works are his books: "Morphological Evolution of the Angiosperms" (1948, in Russian);³⁰ "Origins of Angiospermous Plants" (1954, in Russian; translated by Gankin, 1958, Washington, D. C.);³¹ "Essays on the Evolutionary Morphology of Plants" (1954, in Russian; translated by Gankin, 1959, Washington, D. C.);³² "Vascular Plants I. Psilophytales to Coniferales" (1956, in Russian;

³⁰Морфологическая эволюция покрытосеменных. Москва. (*Morfologicheskaya evolutsiya pokrytosemennyykh. Moskva.*)

³¹Происхождение покрытосеменных растений. Москва. (*Proiskhozhdenie pokrytosemennyykh rasteniy. Moskva.*) (2nd ed. 1961, Moscow.)

³²Вопросы эволюционной морфологии растений. Ленинград. (*Voprosy evolusionnoy morfologii rasteniy. Leningrad.*)

textbook);³³ *Die Evolution der Angiospermen* (1959, Jena); and “Foundations of Evolutionary Morphology of the Angiosperms” (1964, in Russian).³⁴

Takhtajan’s broad research interests include not only morphology and paleobotany but also taxonomy, and recently he has become a champion of biosystematics and other modern approaches to taxonomy in the Soviet Union (5, 22).

Dorofeev, like Takhtajan, is interested in the history and evolution of floras.³⁵

Limited morphological and anatomical studies had been carried out through the years in scattered units of the Institute and its predecessor institutions. In 1942, V. G. Aleksandrov (1887–1964) came to the Institute, and the next year, at the height of the war, he organized a new “Laboratory of Anatomy and Morphology” within the Department of Vascular Plants. Departmental status was accorded the Laboratory in 1949. The early work of Aleksandrov’s group was concerned primarily with anatomy, especially what can be called “applied anatomy,” as might be expected during the war and early postwar years. In the late forties attention was gradually turned to theoretical questions in evolutionary morphology (particularly floral morphology and evolution), embryology, and cytology. As an outgrowth of this trend, the Department of Anatomy and Morphology became the birthplace and organizing center of a number of new and significant research directions in the Institute. In 1953, a special “Laboratory of

³³Высшие растения. I. От псилофитовых до хвойных. Москва-Ленинград. (*Vysschie rasteniya. I. Ot psilofitovykh do khvoynykh. Moskva-Leningrad.*)

³⁴Основы эволюционной морфологии покрытосеменных. М.-Л. (*Osnovy evolutsionnoy morfologii pokrytosemennyykh. M.-L.*)

³⁵Дорофеев, П. И. 1965. О некоторых проблемах истории флоры. Бот. журн. 50: 1509-1522. (Dorofeev, P. I. *O nekotorykh problemakh istorii flory* [“On some problems of the history of the flora”]. Bot. Zhurn.)

Cytology" was founded by M. S. Navashin (1896-),³⁶ and in 1956 M. S. Yakovlev (1902-) organized a separate research team in embryology and morphogenesis.

At the time of his death in 1964, Aleksandrov was the leading figure among plant anatomists and morphologists in the Soviet Union (23), and he certainly stands as one of the foremost Russian botanists of the 20th century. His laboratories became the principal training center of the Soviet Union for graduate work in anatomy and morphology. Outside the Soviet Union he also had become widely known especially from his editorship of the morphology-anatomy series of the Komarov Institute's *Acta* (p. 167) and his textbook, "Anatomy of Plants" (3rd edition 1954, 4th edition 1964), part of which was published in Chinese in 1961 (Peking). During his lifetime he published almost 200 scientific papers and books, many of them in collaboration with his wife and long-time research partner Olga G. Aleksandrova, who, with his son, died in the blockade winter of 1942. Yakovlev and Danilova, in their obituary of Aleksandrov (23), list his publications since 1947 and cite another list of his previous publications. (2, 3, Aleksandrov and Yakovlev in 8, 23)

Aleksandrov, Yakovlev, and others have published some pacesetting anatomical, morphological, and embryological researches in the *Acta*, which have been much overlooked.

Of all the Institute's traditional spheres of inquiry, those that have experienced the greatest program expansion and re-orientation during the postwar years are plant physiology and the experimental disciplines in general. The Institute's experimental researches over the previous years had been strongly directed toward agricultural and other problems, but in the early fifties a series of new laboratories and programs were

³⁶It was Professor Navashin's father, S. G. Navashin (1857-1930), who developed the famous cytological fixative. "Navashin's Solution." See also p. 52.

started which have given the experimental program of the Institute new impetus. The emphasis on applied problems has not necessarily flagged, although it is perhaps less flagrant than it once was, but many of the Institute's experimental researchers of the late postwar and recent period have worked on theoretical problems of genuine interest to biologists everywhere. Researches on the mechanism of photosynthesis have been intensified, and Institute botanists have recently (1965) published studies on the ultrastructure of the chloroplast, for example.

Some of the new laboratories have been affiliated with the existing Department of Ecology and Physiology, headed after 1953 by I. N. Konovalov, specialist on the physiology of growth and development. Other new labs have been set up independently within the Institute, without departmental affiliation. In 1950, the Department of Ecology and Physiology began to collaborate with the Pamir Biological Experiment Station (Tadzhikistan Republic) on studies of photosynthesis in high mountain plants. The group of physiologists on this project were shortly (1952) organized into an independent "Laboratory of Photosynthesis," headed by O. V. Zalensky, where all Institute researches related to photosynthesis, including those concerning pigment chemistry and physiology, were brought together. Also in 1952, Yakimov's laboratory (p. 71), dealing with the biology, biochemistry, and pharmacology of microorganisms, with special reference to the development of antibiotics, was transferred to the Institute as an independent unit, and M. J. Shkolnik's "Laboratory of Microelements" was formed in the Department of Ecology and Physiology. Shkolnik's group has been studying the effects of trace elements and has dealt with many problems of field crop production. In 1957, V. J. Aleksandrov (as distinguished from V. G. Aleksandrov, the anatomist) started an independent "Laboratory

of Cytoecology and Cytophysiology," which later was attached to the Department of Ecology and Physiology. (2, 3, 8)

One final new development of the postwar period deserves special mention. The war had brought the Institute so nearly to total disaster that the surviving staff, shocked by its losses, understandably showed a profound interest in history and heritage, and various members began to devote much attention to botanical history and bibliography. In 1955, this interest in history was given recognition in the Institute by formal creation of a small historical section, headed by Director Baranov. His work on the history of plant embryology was mentioned earlier (p. 79). Two other works growing out of this period are Lipschitz' "Who's Who" of Russian botany (*Botanicorum Rossicorum: Lexicon Biographico-Bibliographicarum*. Vols 1-4. 1947-52. [Through "K"]), which we can only hope will be completed some day, and Lebedev's "Introduction to the Botanical Literature of the USSR: A Handbook for Geobotanists" (1956). The *Lexicon* gives extensive biographies and complete bibliographies for more than 1000 botanists, and it is unrivaled in botanical literature. Both Lipschitz and Lebedev have been extremely active over the years in chronicling Russian botanical history, especially with reference to the Komarov Institute. S. J. Lipschitz (1905-) is a remarkable man—a humanist and a scholar who has had an outstanding career in botany, publishing prolifically in taxonomy, biography, bibliography, and history, beginning in 1928. For the occasion of his 60th birthday D. V. Lebedev and M. E. Kirpicznikov, two of his distinguished colleagues, have written a moving tribute to him, listing his major publications.³⁷ (2)

³⁷Лебедев, Д. В., и М. Э. Кирпичников. 1965. Сергей Юльевич Липшиц (К 60-летию со дня рождения). Бот. журн. 50: 1469-1480. (Lebedev, D. V., and M. E. Kirpicznikov. *Sergei Julievich Lipschitz (K 60-letiyu so dnya rozhdeniya)* [“To his 60th birthday”]. Bot. Zhurn.)

ACTIVITIES IN TRADITIONAL DEPARTMENTS

With the exceptions already given pertaining largely to the Department of Ecology and Physiology, it is fair to say that there have been few significant changes in the basic directions of the research in the existing departments since the war. Long-term researches, interrupted by the war, were resumed gradually in the postwar years, and on the whole new projects have been the outgrowth of existing ones or have followed naturally from the traditional functions of the departments concerned. However, the tempo and scope of traditional activities has increased enormously and continues to do so.

In the **Department of Vascular Plants**, Schischkin became head *de jure* in 1945 after Komarov died, and Takhtajan succeeded Schischkin in 1963. Unfortunately, Schischkin did not live to see the last volume of *Flora SSSR* appear in mid-1964, although he knew its completion was assured. Until very recently, the *Flora* Project was the focal point of departmental research, but, as in prewar years, many other floristic and monographical projects have proceeded simultaneously. With the *Flora* nearing completion, the department's attention turned to new fields. Plans were made in the early sixties and indeed are still being made for new, intensive monographical studies and some type of revision of *Flora SSSR*.

Immediately following the war some of the staff became interested again in tropical research, and the first postwar tropical expedition was conducted by Juzepczuk and Schischkin to Argentina and Brazil during 1947 (pp. 33, 104). In 1955–57, Andrey A. Fëdorov, I. A. Linchevsky, and M. E. Kirpicznikov—all prominent members of the department—conducted a series of expeditions into tropical regions of southwestern China, jointly with Chinese botanists. Presumably, joint research on these collections is in progress. Aleksandr A. Fëderov was in China during 1959–60. Cordial Indonesian-

Soviet relations in recent years have fostered considerable interest in Indonesian plants. In 1961, Andrey Fëdorov and another Soviet botanist participated in a 3-month expedition to Sumbawa in the Lesser Sunda Islands, led by A. Kostermans from the Bogor Botanic Garden and Herbarium (24). This, however, was not the first postwar trip of a Soviet botanist to Bogor (25), nor was it the last. Two years later M. S. Yakovlev, from another department of the Botanical Institute, spent nearly a year (April 1963–March 1964) at the Bogor Botanic Garden on morphological research (26). The curator of the Middle Asian Herbarium of the department, V. P. Botchantsev, made two trips to Egypt recently (1960, 1962) and published an outline of the country's vegetation (27, 28, 29).

These expeditions and many others have added large numbers of specimens to the herbarium since the war. Concerning the long-range growth of the vascular herbarium, Schischkin (*in 8*, p. 90) stated that about 1 million specimens had been added between 1917 and 1957, a period of 40 years. This was an average annual increment of 25,000 specimens, although accessions stopped or trickled during the war years, which was comparable to the growth rate of about 30,000 specimens a year at the U. S. National Herbarium.

Professor Andrey A. Fëdorov (1909–), brother of Director Aleksandr A. Fëdorov, is a leading taxonomist not only in the Botanical Institute but in the Soviet Union. Although Takhtajan, as the new head of the Department of Vascular Plants, became legal heir to Schischkin, Fëdorov has become in a sense the “spiritual” heir. Heading the Laboratory of Systematics, he now directs the largest group of botanists in the department and carries on the taxonomic leadership and many of the editing responsibilities of Schischkin. He is a foremost authority on the Campanulaceae and on

the floristics and systematics of Caucasian plants. After the death of A. A. Grossheim (1888-1948), who was the leading scholar of Caucasian plants, Fëdorov succeeded him as curator of the Caucasian Herbarium and took over the editing of Grossheim's "Flora of the Caucasus" (ed. 2). In recent years Fëdorov has turned much attention to the study of tropical Asian plants, as indicated by his expeditionary activity discussed earlier. At the 10th International Botanical Congress in Edinburgh (1964), Fëdorov, who was the *only* Soviet taxonomist to attend, cochaired a session of the Phytogeography Section and read a paper entitled, "The Structure of the Tropical Rain Forest and Speciation in the Humid Tropics" (Journ. Ecol. 54: 1-11. 1966). He has replaced the late Schischkin as Soviet advisor for the *Flora Europaea* Project, and most recently (1965) has initiated and undertaken to edit a concise "Flora of the European Part of the USSR," to be patterned after *Flora Europaea* and published in three volumes. The help of many Soviet taxonomists will be enlisted for this project. Another of the very noteworthy floristic projects under way in his Laboratory is the preparation of the multi-volumed compendium "Plants of Central Asia," whose chief editor is V. I. Grubov, well-known regional specialist on Central Asia. The first fascicle of this work, providing a comprehensive introduction on the flora and vegetation, treatment of the ferns, and materials toward a bibliography of regional literature on the flora and vegetation, appeared in 1963.

The Department of Cryptogamic Plants (2, 3) reached a climactic moment in the accomplishment of its long-range goals when in 1952 it published the first of the projected multivolume *Flora Sporovykh Rasteniy SSSR* ("Flora of the Cryptogamic Plants of the USSR"). This volume by the eminent bryologist Savicz-Lubitskaya covered the sphagnum mosses of the USSR. By 1960, five volumes covering parts of

the mosses, algae, and fungi had appeared. Alongside this central work, the department has continued to issue monographs and manuals. Notable examples are the 3-volume handbook, "Diatom Analysis" (1949-50), by A. I. Proshkina-Lavrenko and collaborators, which won a state prize, and the "Manual of the Leafy Mosses of the Arctic of the USSR" (1961, 714 pp.), by A. L. Abramova, L. I. Savicz-Lubitskaya, and Z. N. Smirnova. Phycologist M. M. Hollerbach has been carrying out researches in Antarctica in recent years as part of the Soviet biological program there.

The Department of Geobotany (2, 3, 8) has engaged in a large number of theoretical and applied researches since the war and has issued a number of very significant books and maps. Forage crop production and yield, forestation and forest management, and the reclamation of arid lands have been some of the department's chief concerns in the realm of applied science. In collaboration with other departments of the Institute, particularly the Department of Plant Resources, and other Soviet scientific and agricultural institutions, the Department of Geobotany has played a very significant role in the Government's much propagandized "virgin lands" program, spearheaded by former Premier Khrushchev, which put vast acres of virgin or long-fallow arid lands in Kazakhstan and Western Siberia under cultivation.

The department's geobotanical mapping program and its theoretical vegetation studies continue to draw the widest attention and achieve the greatest usefulness outside the Soviet Union of all its manifold researches. Under the editorship of Lavrenko and Sochava, the "Vegetation Map of the European Part of the USSR" (1949, scale 1:2,500,000) and "Geobotanical Map of the USSR" (1955, scale 1:4,000,000, 8 sheets), accompanied by a 2-volume explanatory text, "Vegetation Cover of the USSR," have been issued (1956). In

1957, the department, in collaboration with botanical institutions of the Middle Asian republics, published the "Geobotanical Map of Middle Asia" (1:1,000,000). Special mention should also be given the methodological handbook, "Field Geobotany," which is being published in five volumes, under the general editorship of E. M. Lavrenko and A. A. Korczagin. The first appeared in 1959, and the third was published in 1964 (cf. lengthy review in October 1965 issue of *Botanichesky Zhurnal*). Russian botanists consider this reference work to be a milestone in the literature of geobotany, and, indeed, American botanists have shown much interest in it. The American Institute of Biological Sciences (AIBS) had the first volume translated, but publication has been long delayed because AIBS has ceased translation activities. This volume is only now being printed in England and should appear during 1967.

In 1950, Professor B. A. Tikhomirov (1909—), a leading arctic geobotanist in the Institute, organized a special Arctic Section. Today he is the successor of the distinguished Lavrenko as head of the Department of Geobotany (3). Tikhomirov teaches at Leningrad State University, and he is one of the most senior scientists affiliated with the Institute. Some measure of his ranking is provided by the fact that he has frequently been among the privileged few who have been chosen to represent the Soviet Union at international meetings in recent years. For example, he has attended the last three International Botanical Congresses, in Paris (8th, 1954), Montreal (9th, 1959), and Edinburgh (10th, 1964), respectively, and he had a major coordinating role in the USSR during the planning for the Tenth Congress (30; see also p. 173).

The Department of Plant Resources (2, 3) stepped up its program to discover new plant raw materials and develop

new products after the war, and to this end a Technological Laboratory (head, P. A. Yakimov) and a Chemical Laboratory (head, G. V. Pigulevsky) were set up. In 1950 the department began to issue its voluminous handbook, "Plant Raw Materials of the USSR." Prof. Aleksandr Fëdorov, who has participated in the work of this department since about 1934 and has led a number of important prospecting expeditions, became the head in 1959.

The Department of the Botanic Garden (2, 3, 7, 8, 16, 31) has suffered two major catastrophes in the present century during the two world wars, but each time it has been able to rebuild its facilities, and its programs have gone forward with renewed vigor. Today it stands as one of the leading departments of the Institute. Traditional researches on plant introduction and acclimatization, ornamental horticulture, and landscape architecture have been intensified, and the Garden plays a greater role than ever in theoretical research, both in its own department and in collaboration with other departments. Two recent accounts of the department by Golovach (31) and Avrorin (7), the most recent heads, together give a detailed picture of present resources and programs. N. A. Avrorin³⁸ is currently head. In 1948 the scientific staff, under the editorial direction of S. J. Sokolov, began to compile "Trees and Shrubs of the USSR," a multivolume manual on native and cultivated trees and shrubs suitable for ornamental and other uses in commercial trade. This manual, completed in 1962, occupies six volumes. Avrorin (7), who enumerates important recent publications of the Garden, notes that the

³⁸Department heads in the Soviet period (7):

1917-31, V.L. Komarov (1869-1945)	1942-48, N.V. Shipchinsky
1931-34, A.P. Iljinsky (1888-1945)	1948-58, S.J. Sokolov
1934-38, N.V. Shipchinsky (1886-1955)	1958-60, A.G. Golovach
1938-41, S.J. Sokolov	1960- , N.A. Avrorin

staff is now preparing a manual on the *herbaceous* cultivated plants of the USSR. He predicts that it will include 3000-5000 species. Also, a new catalog of the greenhouse collections is being prepared.

Historically, the Botanic Garden has carried a heavy service load, and today it welcomes upward of 150,000 visitors annually to its greenhouses and outdoor plantings. Several of its staff recently have published popular guidebooks on the Garden (11, 12). Many questions on the growing of plants are directed to the staff by the public, and various members of the staff are specialists on major groups of plants that are commonly cultivated (e.g., *Iris*). The Seed Laboratory answers more than 1000 public inquiries a year.

The Garden plays a large role in plant introduction and takes credit today for having introduced more than 1500 species (primarily decorative) into cultivation in the USSR from its nurseries, greenhouses, and arboretum.

Many of the scientists in other departments of the Institute, for example, the Department of Vascular Plants, grow material in the Botanic Garden for their own research or joint research with Garden scientists. About 170 of the species collected in Brazil and Argentina by Schischkin's party in 1947 are still growing in the greenhouse.

Large foreign and domestic exchange programs are maintained. Through exchange and expeditionary work more than 8000 samples of seeds and fruits were added to the Carpological Collection of the Seed Laboratory between 1948 and 1956, and at present the Seed Laboratory sends out two to three thousand samples a year on exchange.

Programs have expanded much more rapidly than space and facilities, and currently the Garden is planning to build new facilities to handle tropical and subtropical plants and to bring them into flowering under the cold, high latitude condi-

tions of Leningrad. The arboretum-park is to be reorganized and revitalized.

The Botanic Garden continues to be a leader among national botanic gardens of the USSR, of which there are now some 80 (16). Since 1939, when it convened the "First All-Union Conference of Botanic Gardens," it has led the way consistently in sponsoring national symposia and organizing national cooperative research efforts (p. 133).

The Department of the Botanical Museum (2, 3, Polyansky in 8, 13), as already indicated, prospered much after the war. The research and exhibit collections were built up greatly so that by 1965 they comprised about 70,000 specimens falling into three general categories: (1) Economic Botany Collection (plant products and materials), (2) Carpological Collection (seeds and fruits), and (3) Dendrological Collection (wood samples). F. Kh. Bakhteev is currently head curator, succeeding V. I. Polyansky who died in 1959 ³⁹ (see p. 72).

The staff is devoted to the preparation of modern scientific exhibits and to research on various collections. A prime function of the Museum has continued to be public display and education, and its modern building, completed in 1960, and exhibits constitute a major attraction to the public. The new building and completely new exhibits were not formally opened to the public until 1963, and in 1964 nearly 11,000 visitors passed through the halls. The principal exhibit depicts the "Vegetation of the World According to Phytogeographic Provinces," but other important displays show the history of

³⁹Head curators (13; for curators before 1892 see reference 13):

1892-1929, N.A. Monteverde (1856-1929)	1939-41, A.V. Yarmolenko (1905-44) 1941-45, G.V. Arkadyev (1899-)
1929-32, I.V. Palibin (1872-1949)	1946-50, A.N. Krishtofovich
1932, V.N. Sukaczev (1880-1967)	(1885-1953)
1933-34, N.V. Shipchinsky (1886-1955)	1950-59, V.I. Polyansky (1907-59) 1959- , F.Kh. Bakhteev (1905-)
1934-38, K.M. Zavadsky (1910-)	

the world's floras, the biology of plants, and plant resources of the USSR. The Komarov Institute's Botanical Museum is unique among Soviet museums and scientific institutions; its displays throughout the whole Museum are devoted exclusively to plants, making it a highly specialized museum. Probably there is no comparable museum anywhere in the world.

REORGANIZATION IN 1960

It is clear from the foregoing sections that the administrative structure of the Komarov Botanical Institute was by no means static between 1932 and 1960; departmental reorganizations and name changes had frequently occurred, and new departments and laboratories had been added. Nearly all major units of the Institute had changed leadership at least once. At the same time the overall departmental structure of 1932, itself an almost intact carryover from the former Principal Botanic Garden, dating to 1918, had remained basically unchanged. Thus, as previously indicated, the time was overdue for Director Baranov's top-to-bottom administrative shakeup and reorganization in 1960.

Now the whole Institute was subdivided into 24, presumably independent and equal research laboratories.⁴⁰ These in turn were federated into seven, subject-oriented groups, and each group was subordinated to a research council or "Scientific-Methodic Council," as it was called. For the time being, at least, the concept of "department" seems to have been abandoned and replaced by the "council" concept. That this new administrative structure did not remain static for long is evident by comparing the organizational summaries of Lebedev *et al.* (1962) and Fëdorov (1964). Though their

⁴⁰In fact, it is quite clear that the 24 laboratories are not all equally autonomous in actual practice.

accounts of the reorganization both emphasize the creation of 24 laboratories, there are some significant differences in their summaries of the subdivisions. Lebedev *et al.* (2) do not mention departments and simply list 24 laboratories in consecutive order. Fëdorov (3), on the contrary, says there are five departments, two independent laboratories, and the Botanical Museum and Botanic Garden which function as departments. Altogether, the five departments are shown by Fëdorov to be comprised of 20 laboratories, but he does not indicate whether the Botanic Garden and its subordinate physiology laboratory function as one or two laboratories (see below). Lebedev treated them as two.

It is clear that the new Scientific-Methodic Councils soon took on much the same character as the old departments in the bureaucracy of the Institute and by 1964 were functioning in a departmental capacity. Otherwise, the differences between Lebedev and Fëdorov point up the significant administrative changes since the early sixties. A new "Forest Laboratory" has been added to the Department of Geobotany, and the long-standing "Flora Laboratory," headed by E. G. Bobrov right after the reorganization in 1960 (2), has been phased out by the completion of *Flora SSSR*. The "Laboratory of Systematics and Geography of Cryptogamic Plants," still headed by the senior lichenologist V. P. Savicz in 1960, has been subdivided (see below).

According to Director Aleksandr A. Fëdorov (3), the following departments and laboratories were functioning within the structure of the Institute as of the 250th anniversary celebration in 1964; their directors as of that time are given in parentheses.⁴¹ I have numbered the 24 labora-

⁴¹Professor Fëdorov was kind enough to send me a reprint of his paper (3), including an English translation of the section summarizing the departments and laboratories, when he heard of my intention to write about the Komarov Botanical Institute. In general I have followed his translation in summarizing

tories consecutively.⁴²

I. DEPARTMENT OF VASCULAR PLANTS (A. L. Takhtajan)

1. Laboratory of Systematics (Taxonomy) and Geography of Vascular Plants (Andrey A. Fëdorov)
2. Laboratory of Paleobotany (A. L. Takhtajan)
3. Laboratory of Cytology (M. S. Navashin)
4. Herbarium of Vascular Plants (I. T. Vassilczenko, curator)

II. DEPARTMENT OF CRYPTOGAMIC PLANTS (M. M. Hollerbach)

5. Laboratory of Algology (M. M. Hollerbach)
6. Laboratory of Mycology (M. A. Litvinov)
7. Laboratory of Lichenology and Bryology (I. I. Abramov)

III. DEPARTMENT OF GEOBOTANY (B. A. Tikhomirov)

8. Laboratory of General and Experimental Geobotany (E. M. Lavrenko)
9. Laboratory of Vegetation of the Northern Regions [of the USSR] (B. A. Tikhomirov)
10. Laboratory of Vegetation of the Forest Zone [of the USSR] (A. A. Korczagin)
11. Academician V. N. Sukaczev's Group (in Moscow working on problems of biogeocoenology) [Sukaczev died in 1967; see p. 51.]
12. Laboratory of Vegetation of the Arid Regions [of the USSR] (L. E. Rodin)
13. Laboratory of Botanical Cartography (A. A. Yunatov)

these units here, but not entirely. I have, however, used his translation for the first two departments listed, both here and throughout this paper, because his are the most common of the several translations used in Russian sources. In Russian, the titles are *Отдел высших растений* (*Otdel Vysshikh Rasteniy*) and *Отдел низших растений* (*Otdel Nizshikh Rasteniy*), respectively, which literally translated would be "Department of Higher Plants" and "Department of Lower Plants." Recently, there has been a tendency on the part of the Institute (e.g., on stationery) to use these literal translations. In terms of the plants covered, the perfectly acceptable and parallel translations "Department of Vascular Plants" and "Department of Nonvascular Plants" would actually be the most accurate and linguistically consistent. However, there is another Russian word for "vascular," often used in other contexts—*сосудистый* (*sosudisty*).

⁴²Fëdorov really lists more than 24 laboratories in his paper and does not indicate which ones comprise the heralded "24"; my numbering is based on his translation (see footnote 41) which eliminates the laboratories placed in parenthesis here.

14. Laboratory of Cytoecology and Cytophysiology (V. J. Aleksandrov) (Department also has a "secondary" Soil Ecology Laboratory)

IV. DEPARTMENT OF PLANT RESOURCES (ECONOMIC PLANTS) (Aleksandr A. Fëdorov)

15. Laboratory of Plant Resources (Botany of Economic Plants) (Al. A. Fëdorov)

16. Laboratory of Chemistry of Plant Materials [so-called "Chemical Laboratory" of Institute] (I. S. Kozhina)

17. Laboratory of Lower Plant Biochemistry [Microorganisms] (A. N. Shivrina)

18. Technological Laboratory (S. D. Steinbock)
(Introduction Nursery of Medicinal and Commercial Plants—V. S. Sokolov)

V. DEPARTMENT OF EVOLUTIONARY MORPHOLOGY (M. S. Yakovlev)

19. Laboratory of Embryology (M. S. Yakovlev)

20. Laboratory of Anatomy and Morphology (M. F. Danilova)

VI. BOTANIC GARDEN (N. A. Avrorin)

(Outdoor Plantings—A. G. Golovach)

(Indoor Plantings—S. G. Saakov)

21. Laboratory of Plant Growth and Development (I. N. Konovalov)

VII. 22. BOTANICAL MUSEUM (F. Kh. Bakhteev)

VIII. 23. LABORATORY OF PHOTOSYNTHESIS (O. V. Zalensky)
[physiology and ecology of photosynthesis]

IX. 24. LABORATORY OF MICROELEMENTS (M. J. Shkolnik)
[mineral nutrition; physiological effects of trace elements]

The Institute also has an affiliated Experimental Station at Otradnoye near Leningrad and field plots on some local state farms.

These "laboratories" represent the primary research groups of the Institute. Each laboratory concentrates related investigations and responsibilities of the Institute's total program under

one chief. Ideally, each laboratory group consists of no less than 5 to 7 staff members. Some of the laboratories are functional units, working together on a daily basis in the manner that the term "laboratory" ordinarily connotes, while others are mainly coordinating units, loosely federating botanists of a common discipline (e.g., lichenology) or program (e.g., *Flora SSSR*). A given scientist may carry out duties in a functional laboratory and conduct research in a coordinating laboratory (e.g., Laboratory of Systematics) (32). In the collection-oriented departments (e.g., Cryptogamic Plants), the subdivision into "laboratories" has made it possible to assign curatorial responsibilities objectively. In the Department of Vascular Plants this goal is achieved by means of a geographical subdivision (see next section).

Some laboratories are firmly established administrative units in the organizational structure of the Institute, and they have a measure of permanence and continuing influence, whatever they are called from time to time. Other laboratories seem to be little more than transitory paper titles which have a way of changing or disappearing at will. Obviously, such titles come cheap, as in all bureaucracies; yet they serve the legitimate, universal, bureaucratic function of giving recognition and support to disciplines and programs and providing directorships—with their accompanying prestige, equality, and autonomy—for many scientists who otherwise would be slighted in the power structure. One need only scan a roster of Soviet delegates to an international congress to appreciate the magic and "pull" of being a "director," whatever you direct (30). (The Russian word for director is a favorite title for scientific administrators at all levels, but in the English context it often should be translated by some lesser word [head, chief, chairman, curator, etc.].)

The goals of the Institute have not changed with the reor-

ganization. Fëdorov (3, pp. vii–viii) restates them for the modern period in this way (translation mine):

All scientific activity of the Botanical Institute is directed toward elucidation of theoretical problems of botany and the application of scientific advances to the practices of the national economy and medicine. . . .

The staff of BIN [Botanical Institute] will increase its efforts toward the development of science for the welfare of our Homeland and for the building of communist society.

PRESENT STAFF AND RESOURCES

A fairly comprehensive picture of the present-day staff, resources, and scope of research activity of the Institute has already been developed in the course of discussing departmental growth and activity since 1932. It remains only for me to add some specialized information concerning several important features in the Institute's present status that were not covered previously.

The total staff, including professional and laboring forces, approaches 700 persons today, ranking the Institute among the largest institutions in the Soviet Academy's Division of General Biology. Nearly 40 staff members hold the degree of Doctor of Biological Science and another 175 the degree of Candidate of Biological Science.⁴³ Thus there are over 200 members who hold a graduate degree, but these do not by any means comprise the whole scientific staff. A large cadre of

⁴³This doctorate is earned only after long experience and is held by senior people; it is a sort of "super" Ph.D. The candidate degree is the common higher degree of all seniority levels and may be held by relatively young, inexperienced scholars. Its closest analog in the American system would seem to be a dissertation master's degree, although its functional value in the Academy's system would seem to be almost equivalent to that of a Ph.D. in America. Technically speaking, only the holder of the Doctor of Biological Science degree is entitled to be addressed "Doctor," but this title is commonly applied to a "Candidate" as well (20, 32).

professional botanists in the Institute do not hold any graduate degree.

Many of the Institute's more than 200 living botanists have already been mentioned or discussed in previous sections, because their activities were germane to the account, but a larger number of them must of necessity go unnamed even though in many cases they are no less outstanding nor are their contributions any less significant. In particular, the experimental laboratories and scientists have been slighted here. This is due in the first place to the fact that the rich historical tradition of the St. Petersburg-Leningrad botanists is descriptive rather than experimental and in the second place to my own bias and lack of competence to judge the significance of the experimental trends that are developing.

The full scientific staffs of the vascular and cryptogamic herbaria are given, as of 1964,⁴⁴ in *Index Herbariorum* (33, p. 100), and a somewhat more up-to-date roster (as of August 1964) of the vascular herbarium staff is given by Chater (32), listed according to the geographical sectors of the herbarium (see breakdown given on p. 127). He also lists the current members of Andrey Fëdorov's Laboratory of Systematics. The International Directory of Botanical Gardens (16, pp. 72-73) lists 11 of the prominent scientific members of the Botanic Garden's staff as of 1963,⁴⁴ but the full staff numbered 83 already in 1960, about 16 of whom could be called "scientific" staff (31). The Botanical Museum had a staff of 16 in 1965, all named by Bakhteev and Chavchavadze in their recent paper on the Museum (13). To my knowledge there is no published roster of the entire current staff of the

⁴⁴Actually, these are dates of publication, and they are misleading. Undoubtedly there was at least a 1-year lag between the time when the data were submitted and when they were published. For example, P. A. Baranov died in 1962 although he is still listed in the 1963 International Directory of Botanical Gardens.

Institute, and I have no information for other departments.

The scientific personnel or intelligentsia of the Soviet Academy of Sciences, whatever their institutional post, fall into an elaborate and rigid academic-social stratification, in which, according to Vucinich (20), who devotes an interesting chapter to the social structure of the Academy in his book "The Soviet Academy of Sciences," a man's status is determined by his academic degrees, scientific title, and administrative rank in the Academy. A fourth factor is his teaching affiliations in the universities or pedagogical institutes. A man who holds the doctorate and teaches in a university on a part-time basis is usually called a "Professor," and this title sets him a notch above an ordinary "Doctor," both in prestige and influence or responsibility, although it is not a rank in the Academy's hierarchy.⁴⁵

In terms of academic degrees the scientific personnel fit into four categories, given in descending order: (1) doctors, (2) candidates, (3) college graduates (equivalent to American bachelor's degree), and (4) persons without a college degree. In terms of scientific titles the Academy's hierarchy from top to bottom is as follows: (1) academician, (2) corresponding member, (3) senior scientific worker, (4) junior scientific worker, and (5) technical or research assistant. Academicians and corresponding members, who must hold the doctorate and are very often professors as well, invariably occupy the highest administrative posts in institutes like the Komarov Botanical Institute. Senior scientific workers must hold the candidate degree, but junior scientific workers may or may not hold this degree. The assistants fall into several types, depending on whether they are working full time or are also part-time

⁴⁵"The title 'Professor' is granted not by universities but by the Ministry of Higher Education. To be a Professor does not necessarily mean to be a college or university teacher but it almost always implies the possession of a Ph.D. degree" (20, p. 107).

students. Scientists who are academicians or corresponding members of one of the Academy's provincial branches (e.g., Armenian Academy of Sciences) do not rank with members of the national Academy, but they do stand above ordinary doctors or professor-doctors in the institutes. In the Komarov Botanical Institute the laboratories and departments are not necessarily headed by doctors and professor-doctors, and many with a doctorate do not head any administrative unit. (20, 32)

The herbarium resources have increased steadily over the years until today the number of specimens is approximately 6 million, including about 450,000 specimens of cryptogamic plants (mosses, lichens, fungi, algae). This huge national herbarium is certainly one of the largest in the world, probably second only to the combined herbaria of the Royal Botanic Gardens at Kew (England). From the international standpoint, the herbarium is by far the most important botanical resource that the Institute possesses, although the significance of its botanical library should not be underrated (see below). The herbarium has most of the classical *exsiccatae* (Boissier, etc.).

The vascular herbarium is divided into geographical sections, which were established at the time of the Revolution (1917–18) essentially as they are today (see p. 39). These sections, housed in separate wings or floors of the main Herbarium-Library Building, their chief curators, and their relative sizes in terms of specimens are as follows (1, 4, Schischkin in 8, 32): (1) European USSR (Russia and Crimea), N. N. Tsvelev, 850,000 specimens; (2) Caucasus, An. A. Fëodorov, 300,000; (3) Middle Asia (Uzbekistan, etc.), V. P. Botchantsev, 1,500,000; ⁴⁶ (4) Eastern and Central Asia (China, Mongolia, etc.), V. I. Grubov, 300,000; (5)

⁴⁶A printing error ("1,000,5000") in Vassilchenko's paper (4) makes it impossible to know whether he meant 1,000,500 or 1,500,000, but the latter is more logical considering the order of magnitude of the other figures given.

Siberia and the Far East, S. J. Lipschitz, 500,000; (6) General Herbarium (all other parts of the world), M. E. Kirpicznikov, 2,000,000; and (7) Duplicate Division, S. K. Tcherepanov, 100,000 (waiting for distribution as of 1965). Types are kept separate. The herbarium is presently very crowded in its antiquated quarters and plans for expansion are being contemplated.

The library resources (Lebedev *in 8*) of the Botanical Institute and its predecessor, the Imperial Botanic Garden, have always comprised one of the finest botanical libraries in the world. In 1824, when the Garden's library was founded, there were 1185 bound volumes; by 1875, the number had reached 16,584; by 1913, 38,420; by 1946, 145,000; and by 1956, 196,000. In 1964, Chater (32) estimated the number of volumes to be about 250,000, and Fëdorov (3) said there were about 400,000 pieces of literature. Today, Fëdorov (correspondence 1966) gives the figure of 450,000 volumes.⁴⁷ No matter how one reckons, the Komarov Botanical Library, covering all aspects of botany, theoretical and applied, represents by far the most complete botanical library in the Soviet Union, and abroad it has few peers. It surely compares quite favorably with such great collections as are found in the botanical libraries of the British Museum (Natural History), Harvard University, and in Washington, D. C. (combined libraries of the Congress, Department of Agriculture, and Smithsonian Institution).

A comparison of the Komarov Library's foreign and domestic holdings was provided by Lebedev (8, p. 273) in 1957: "If one counts not according to bindings, but according to so-called publication units, then in 1956 there were 384,700 units, 259,750 of them foreign, preserved in the Library" (translation mine). Thus, about two-thirds of their total

⁴⁷There is some question as to what constitutes a "volume" in these various estimations.

collection was foreign. Further, he stated that some 2000 domestic and 3000 foreign (i.e., three-fifths foreign) journals and serials were being taken in 1956. It would be interesting to have comparable figures for the best American botanical libraries. Those foreign visitors who have had occasion recently to use the Komarov Library extensively have found the non-Russian holdings to be remarkably good, although not without some surprising gaps (Chater [32]; Cronquist, personal conversation 1966). As Chater (32) points out, the good foreign coverage is all the more remarkable because of the currency restrictions which force the Library to obtain nearly all of its foreign literature by exchange. These same difficulties, however, are faced by foreign libraries in trying to secure Russian literature.

Two catalogs are maintained—the so-called “Basic” and “Real” Catalogs. The Basic Catalog is an author catalog divided into two sections, Russian and foreign. Russian publications naturally are cataloged according to the Cyrillic alphabet, while foreign publications are cataloged according to the Latin alphabet. Therefore, except for languages such as Chinese, the publications are handled in their original tongue, and the problem of a “transliteration language” is avoided. The Real Catalog is a subject index to the literature taken by the Komarov Library. This catalog is not complete, but it is nonetheless extensive.

Commenting on the dual cataloging, Chater (32, p. 10) wrote:

The catalogue, of over 1 1/4 million cards, is extremely comprehensive and extensively cross-referenced. Since 1941 the cataloguing has been so thorough that every paper in every periodical volume entering the library has been catalogued under author and subject. It is tragic to find that because of staff shortages this uniquely valuable procedure is having to be curtailed

The curtailment will involve a rigorous selection of the articles

to be cataloged, according to Director Fëdorov (correspondence 1966). All periodicals will be examined, as before, but only the most pertinent articles will be cataloged.

In the stacks, the books are arranged primarily by accession number. The stacks are not open to the general user, and it is necessary to make requests through the librarians for any materials desired.

The Library's resources include a large reference section (atlases, dictionaries, encyclopedias, etc.) and a rich collection of herbals, including some exceedingly rare ones beginning with a copy of one of the first printed herbals, *Ortus Sanitatus* (1484), in the typography of Gutenberg. The extremely good 18th century collection includes a virtually complete set of Linnaean works. Somewhat foreign to the concept of a botanical library in the United States, is the political, Marxist-Leninist section, maintained "to help the coworkers of the Institute who are increasing their own political education" (8, p. 276).

From its founding the Library has had a series of remarkable head librarians: L. L. Fleri, founder (1825–45), E. K. Berg (1849–64), F. E. Herder (1868–92), I. G. Kling (1895–99), G. A. Nadson (1899–1929), I. A. Ol (1929–41), D. V. Lebedev (1946–49, 1951–52),⁴⁸ and N. V. Tsvetkova (1953–), who have written or fostered the writing of important bibliographical and historical books and papers concerning the Institute's Library or other departments. The first printed catalog of the Library was published by Berg in 1852. He also published (1857) a valuable list of items in the Library's early holdings that were not included in the first edition of Pritzel's *Thesaurus*, and the value of this "supplement" was acknowledged in a later edition (1871, p. 23, see

⁴⁸Lebedev was in charge of the entire library of the Soviet Academy of Sciences from 1949–51. He is still very active, serving at present as "Scientific Secretary" of the Institute.



Courtesy Komarov Botanical Institute

В. Я. Александров
V. J. Aleksandrov (1906-),
cytophysiologist.



From Bot. Zhurn. 50(12), 1965

Фатих Х. Бахтеев
Fatikh Kh. Bakhteev (1905-),
economic botanist.



Photograph by Arthur Cronquist

Евгений Г. Бобров
Evgeniy G. Bobrov (1902-),
taxonomist.



Courtesy Komarov Botanical Institute

Иван Т. Васильченко
Ivan T. Vassilchenko (1905-),
taxonomist.



Максимилиян М. Голлербах
Maksimilian M. Hollerbach
(1907-), phycologist.



Евгений М. Лавренко
Evgeniy M. Lavrenko (1900-),
geobotanist.



Михаил С. Навашин
Mikhail S. Navashin (1896-),
cytologist.



Всеволод П. Савич
Vsevolod P. Savicz (1885-),
lichenologist.



Courtesy Komarov Botanical Institute

Владимир Н. Сукачев
Vladimir N. Sukaczev (1880-1967), geobotanist.



Photograph by Arthur Cronquist

София Г. Тамамшян
Sophia G. Tamamschian, taxonomist.



Courtesy Komarov Botanical Institute

Армен Л. Тахтаджян
Armen L. Takhtajan (1910-), morphologist.



Courtesy Arthur Cronquist

Professor Takhtajan looking at handsome specimen of root-parasite, *Orobanche gigantea*.



Борис А. Тихомиров
Boris A. Tikhomirov (1909-),
geobotanist.



Андрей А. Федоров
Andrey A. Fëdorov (1909-),
taxonomist.



М. Я. Школьник
M. J. Shkolnik (1907-), physi-
ologist.



Михаил С. Яковлев
Mikhail S. Yakovlev (1902-),
developmental morphologist.

entry under Berg). A revised, second edition of Berg's catalog was published by Herder in 1866 and further supplements by Kling in 1899. (Lebedev *in* 8, pp. 271-277)

NATIONAL ROLE

From its inception in 1931, when it was created by the merger of Russia's two leading botanical institutions of the time, the Komarov Botanical Institute has played a central role in Soviet botany and biology generally—as pioneer, organizer, coordinator, leader, educator, and inspirational focus of botanical research and development. Having been founded at a time when the Soviet Academy of Sciences was undergoing its first major reorientation after the Revolution, which shaped the Academy as a scientific tool for the achievement of the economic, industrial, and social goals of the State (see p. 175 and following), the Botanical Institute was called upon in particular to launch vast new programs aimed at the surveying, cataloging, mapping, and, ultimately, the exploiting of the Soviet Union's vast plant resources, up until this time scarcely touched. These goals were well fitted to the traditional strengths—taxonomy, geography, ecology, sociology, and economics of plants—of the Institute's predecessor institutions. Efforts in applied botany were redoubled, as epitomized by the creation of the Department of Plant Raw Materials and Botanical Prospecting, in 1934.

To this day the Komarov Institute has retained its national leadership and responsibility in descriptive botany and in the science and technology of plant prospecting and utilization. The Government continues to charge the Institute with important tasks in these areas (22). Fëdorov (3, p. VII), speaking of the contemporary situation, writes:

The majority of the co-workers of BIN [49] are investigating the problem of the 'Biological bases for rational use, regeneration, and conservation of the plant world.' In this problem, the Institute coordinates all botanical topics being investigated in the institutions of the Academies of Sciences of the union republics, and also in the chairs of botany in the universities and pedagogical institutes. (Translation mine.)

Although the Institute has carried out large programs in applied physiology and ecology, it has not distinguished itself in the past, particularly in the area of theoretical plant physiology, except in a few selected cases. Today, the leading physiological laboratories of the Soviet Union are in Moscow, as one can readily appreciate by noting the home institutions of the Soviet physiologists who attended the 10th International Botanical Congress (30).

The hallmark of Russian scientific endeavor in the Soviet period, especially since the Academy's reorganization in 1929, has been *collective planning and programing* imposed by the State through the intermediary of the Academy of Sciences or the Ministry of Higher Education. In the realm of botany this general approach and focus has placed a strong emphasis on colossal projects and broadscale collaborative research leading to multivolumed floras, handbooks, manuals, etc., which have important economic applications. Even an effort like the *Flora SSSR* Project, seeming on first thought to be too theoretical and too long range for the immediate technological problems of agriculture and industry and hence not a justifiable endeavor, was a well-conceived part of the Academy's general mission to inventory and exploit the Soviet Union's natural resources (5, 9, 10, 20).

The Komarov Botanical Institute has been the Academy's arm for the collective planning and programing of much

⁴⁹BIN is the Russian abbreviation for the Botanical Institute: [B]otanichesky [IN]stitut. (БИН: Ботанический Институт.)

botanical research. Under specific mandates from, and the general sponsorship of, the Academy's Division of General Biology, the Institute has been instigator and convener of numerous "All-Union" planning conferences. These are called from time to time to assess the progress of Soviet botany, chart new programs and goals, and marshal the botanical forces to achieve these goals. Each conference is centered about a particular theme or discipline (e.g., geobotany, plant introduction), and it is attended by specialists in that field from all parts of the Soviet Union. Examples of some early conferences held at the Komarov Institute that led to important new collaborative efforts are: First All-Union Conference of Geobotanists and Plant Taxonomists (1931); First All-Union Conference on the History of the Flora and Vegetation of the USSR (1938); First All-Union Conference of Botanic Gardens of the USSR (1940); and First All-Union Conference on Plant Anatomy, Morphology, and Embryology (1947) (2, 3, 8). These conferences are on the order of symposia, with prepared papers by authoritative specialists, which in some respects are analogous to symposia sponsored by the American Institute of Biological Sciences or the American Association for the Advancement of Science, and other scientific societies at their annual meetings, except that such American symposia are seldom required or empowered to organize collective programs.

Many other symposia, covering all phases of the Institute's research, have been and are still being sponsored by the various departments and laboratories of the Institute; almost invariably some concrete project is evolved for future work. These symposia are usually reported in *Botanichesky Zhurnal*. Of particular interest among recent "state-of-the-art" meetings held at the Institute are the so-called "seminars" on geobotany—extended study institutes held in the Department of Geobotany. The first was conducted in 12 sessions between

October 1961 and May 1962 (34), and the second was conducted in 19 sessions between November 1962 and May 1963 (35).

The Institute's botanists have long dominated the leadership of the national "All-Union Botanical Society" and the editorship of its official organ, *Botanichesky Zhurnal* (see pp. 51, 169).

Like all units of the Academy of Sciences, the Botanical Institute has always been an integral part of the Soviet system of higher education, and it has played a major national role in the training of scientific and technical specialists in the botanical and related sciences. Many of the staff have held professorial positions and lectured part time at Leningrad State University or other pedagogical institutes around the city. The Institute's laboratories and collections are used by graduate students who are conducting research and writing dissertations under the direction of the staff, and the Academic Council of the Institute has the authority to confer the degree of Candidate of Biological Science and to recommend for the degree of Doctor of Biological Science (see footnote on p. 124).

Two kinds of graduate students study in the Institute (2, 3, 8, 20, 32). *Aspirants* are engaged in a full-time program of training and research leading to the candidate degree. *Soiskateli* ("competitors") are staff members who also are working part time toward an advanced degree and are expected to take more than the usual time to complete their program and write their dissertation. The candidate program, called *aspirantura*, normally takes 3 years and requires teaching and research experience as well as a dissertation.

Doctoral studies involve no formal training program. Any scientific worker of any botanical institution who holds the candidate degree can prepare a doctoral dissertation for defense before the Academic Council of the Institute without

undergoing special training or examinations. Thus the candidate degree is the highest degree awarded for *formal* graduate training.

Hundreds of Soviet botanists have done all or part of their graduate work at the Institute, and a very large number of candidate and doctoral dissertations have been written and defended here. At present the Academic Council accepts upward of 20 dissertations a year in fulfillment of the requirements for either the candidate or doctoral degree. Some of these graduates stay on at the Institute, joining the staff, but most take up posts in the many provincial institutions. In the postwar period more than 200 candidate degrees and nearly 100 doctoral degrees have been earned at the Komarov Botanical Institute.

A program of popular education is carried on by means of the temporary and permanent displays or plantings of the Botanical Museum, Botanic Garden, and outdoor park-arboretum, altogether attracting upward of 200,000 visitors annually in recent years, including many school classes, and by means of public lectures at the Institute and at various places in the city, given by members of the staff (3). As mentioned earlier, the new Museum building and exhibits were opened in 1960, and the Institute now has a botanical museum second to none in the Soviet Union. More than a half-dozen of the Botanic Garden's greenhouses and conservatories are open to the public, and they feature various geographical and systematic groupings of plants, including representative collections of tropical palms, aroids, ferns, orchids, and bromeliads. The outdoor collections are well mapped and described in Zamyatnin's little guidebook (11), which is designed to be self-guiding and has appended a complete list of the outdoor woody plantings as of 1960.

Both on a local and on a national scale, the Institute's staff

is perennially called upon to render public service in a consultative capacity, for example in connection with legal and medical problems. An enormous amount of identification work is done in the Herbarium each year as a public service.

FLORA SSSR

In mid-1964, the thirtieth and final volume of *Flora Unio-nis Rerum-publicarum Socialisticarum Sovieticarum* (*Flora URSS*) was issued to the botanical world, ending one of the most ambitious floristic projects in the long history of botany. The first volume of this *Flora*, known in Russian as *Flora SSSR*⁵⁰ and in English as the "Flora of the USSR," appeared in 1934, almost exactly 30 years before. Thirty-five years elapsed from the initial planning to the publication of the final volume; about 33 years were required for the actual writing; and the 30 volumes were published at the average rate of one per year, despite the political turmoils of the late 1930s and the devastating interruption of World War II.

Seldom if ever has a flora of such detail and scope been written for such a large sector of the world. Today the borders of the Soviet Union embrace nearly one-fifth of the earth's land-mass, including the greater part of the boreal and temperate zones of the Northern Hemisphere. According to *Flora SSSR*, the native *vascular* flora of this far-flung region is comprised of 17,520 species belonging to 1676 genera and 160 families. This represents an average content per volume of about 600 species, 50 genera, and 5 families.

⁵⁰Флора СССР (*Flora SSSR*) is the official Russian title and appears on the Russian title page only as an abbreviation. However, it is derived from the full Russian name of the Soviet Union: Союз Советских Социалистических Республик (*Soyuz Sovetskikh Sotsialisticheskikh Respublik*).

An Alphabetical Index to the 30 volumes was published in 1964; it was compiled by A. E. Matsenko, L. I. Ivanina, and T. G. Leonova under the editorship of E. G. Bobrov and N. N. Tsvelev.

Altogether, 22,000 pages of text and 1250 plates, composed of 10,000 original drawings, were published in the 30 volumes. More than 1500 species were described as new to science, as well as scores of new genera. The usefulness of this *Flora* extends far beyond the boundaries of the USSR. Not only does it stand as perhaps the most exhaustive and comprehensive work of all time on the flora of continental Asia, but it also is a critical work for all students of the circum-polar arctic flora. (5, 9, 10, 36)

The *Flora* Project—its history, problems, and general significance—is discussed at length in the very interesting recent articles by Bobrov (9, 10) and Takhtajan, Tolmatchev, and Fëdorov (5). All are prominent botanists who are or have been affiliated with the Komarov Botanical Institute,⁵¹ where the Project was administered and most of the work was done. Except perhaps for Takhtajan, all have taken some part in the production of the *Flora*. However, E. G. Bobrov (1902–) has had much the more intimate association, serving as “secretary” of the Editorial Committee from the beginning to the end. He discharged the routine organizational chores of keeping the *Flora* moving. He coedited most of the later volumes, including 10 with Schischkin, and was among the most prolific contributing authors. Without doubt Professor Bobrov is one of the real heroes of this *Flora*, overshadowed only perhaps by Komarov and Schischkin (see later). He is the only functionary of the original committee who has survived the Project from beginning to end and now lives to appraise and enjoy the fruits of those 33 hard years. But for his organizing genius and lifelong devotion, the *Flora* may well have fallen short of the mark. Today, at 65, Bobrov is a “grand old man” of taxonomy at the Institute. One of its least heralded scholars, he is at the

⁵¹At present, Tolmatchev (1903–) is a professor at Leningrad State University, in charge of the Chair of Botany since 1960, but he is a member of the Scientific Council of the Botanical Institute with which he maintains close ties.

same time one of its finest and most distinguished, having made one of the greatest contributions of the past 35 years to its programs.

Bobrov's first report (9) on the *Flora* Project was published in English (*Nature*, March 13, 1965), his second (10) in Russian (*Bot. Zhurn.*, Oct. 1965). Both reports are based on the paper he read on May 29, 1964, before a special meeting at the Komarov Botanical Institute celebrating the completion of *Flora SSSR*, and they are largely the same, although the differences are interesting. He concerns himself primarily with a factual account of history, and it is obvious that he was an insider to the Project all along and that his heart was in the center of the work. It is a touching story, a vivid recounting of a sentimental journey. In the *Nature* article he concludes in this manner:

Flora URSS is thus completed. We remember all our colleagues, many of them long dead, who contributed to its achievement.

We have done what we could. We welcome the young botanists and wish them success.

Fecimus quod potuimus. Vivant sequentes.

The Russian version (*in Bot. Zhurn.*) is even more expressive. In it he adds the comment that the names of his departed colleagues are "immortalized" by their parts in the *Flora*. "To us," he writes, "befell the high honor of seeing 'Flora SSSR' to the finish—the greatest botanical endeavor of our century."

By contrast, Takhtajan, Tolmatchev, and Fëdorov were relative outsiders to the *Flora* Project, although the latter two contributed important treatments to the *Flora*. Their joint article on the *Flora*—the lead article in the October 1965 issue of *Botanichesky Zhurnal*, appearing just ahead of Bobrov's paper, which, however, was submitted almost a year earlier than theirs—is a more philosophical discussion of floristics in general but with specific reference to *Flora SSSR*, its character,

history, technical and theoretical problems, and its intellectual influence on Soviet botany. Having less vested interest than Bobrov, they are able to take a more detached view and to argue objectively the strengths and weaknesses of the Komarovian concepts undergirding the *Flora*. Takhtajan and Tolmatchev have been active teachers at Leningrad State University, and no doubt their teaching has been responsible for their great interest in taxonomic theory. Bobrov also stresses the need for new methods, but he comes out more clearly in defense of Komarovian methods as having continuing viability.

Background

The first attempt to publish a complete flora of the vast regions of Imperial Russia was made by the celebrated naturalist Pallas in the late 18th century. His sumptuous *Flora Rossica* (1784–1815; 2 vols. in 3 pts.) was never finished, however (p. 44). In the mid-19th century Ledebour published his excellent 4-volume *Flora Rossica* (1842–53), which included all known Russian species. This classic work at once became the standard compendium. The idea of preparing an up-to-date work to replace Ledebour's *Flora* was first proposed at the close of the 19th century by Academician Korshinsky, director of the Botanical Museum of the Imperial Academy of Sciences in St. Petersburg, who initiated a program at the Museum that was never to gain sufficient support and momentum to carry it through to completion (p. 58). Already in Korshinsky's time Ledebour's *Flora* was nearly 50 years old and hopelessly incomplete for ordinary identifications of Russian plants. Only some 6500 species were described in this work—hardly more than a third of the native vascular flora known today. Moreover, his *Flora* was written in Latin and could be used only by scholars (2, 8).

Although Korshinsky's grandiose plan did not succeed, it did stimulate a whole new cycle of floristic research. In the closing years of the last century and the early years of the present, a series of important local and regional floras were initiated, which, although not all completed, began to fill the gaps and assume crucial places in the growing shelf of floristic literature on Russia (5, 9). Some of these floras were real classics that still are very useful. The greatest stimulant of this period came from the collections of the various far-ranging explorations of the Transmigration Bureau (p. 30) in the early 1900s (2, 8). World War I and the Revolution brought a prolonged and serious interruption to the floristic research that was now under way, and it was not until the mid-1920s, after the strife of the civil war was over and normal activities were being resumed, that the feverish prewar pace was restored. In fact, floristic researches were begun on an even larger scale than before, because of the increased demand for basic knowledge about Russia's natural resources. The momentum generated during this second cycle of activity has kept Soviet botany on a strong floristic course right down to the present time, although in recent years the cause of floristics has definitely begun to wane (5, 32).

Fedtschenko's Plan

In the late 1920s, Russian botanists, emboldened by the greatly increased demand for the results of floristic exploration and spurred by new political pressures, turned again to the idea of producing a comprehensive, definitive flora to replace Ledebour's *Flora Rossica*. Shortly, the concept and plan for *Flora SSSR* were born. In 1929, the First Five-Year Plan (1928-32) was published, and among the several projects it assigned to the Herbarium of the Principal Botanic Garden

in Leningrad was the task of developing a detailed plan for the preparation of a "Flora of the USSR" (i.e., *Flora SSSR*) (9). B. A. Fedtschenko was chief curator, and to him this task must have been a welcome challenge. Ever since he had taken charge of the Herbarium in 1905 he had championed floristic exploration and had devoted much effort and care to building up the collections, which by now totaled more than 3 million specimens. He was clearly looking toward the day when a *Flora SSSR* could be written. His dedicated efforts over 25 years to build up a well-curated herbarium representing the plants not only of all parts of Russia but of the whole world had contributed in large measure to the propitious conditions that now faced the collective of authors on the eve of this monumental undertaking. And behind his own 25 years were nearly 200 years of previous floristic discovery and collecting. The groundwork had been well laid, and, as Bobrov (9) aptly points out to all who might misunderstand, this *Flora* which is now finished was not created from nothing. Without those two-and-one-quarter centuries of prior effort by dedicated and farsighted men of science, the great national treasury of specimens and books would not have been available in 1929 to begin this task that so urgently needed doing.

The idea of *Flora SSSR* was a big concept by any standards and as such it was electrifying, but to seasoned professionals like Fedtschenko it must also have been awesome, filling them with doubt and fear. In any event, *Flora SSSR* had become a public goal with the proclamation of the Five-Year Plan, and whatever misgivings the botanists of the Herbarium may have had, they now had to lay these misgivings aside and join the project. Announcement of the *Flora* Project naturally precipitated much active discussion, which continued for many months during 1929-30, and soon the botanists at the Herbarium, in other departments of the Botanic Garden, and

throughout the Soviet Union became genuinely enthusiastic. Bobrov (9) describes how authors were enlisted. The year 1930 was spent pledging authors. The procedure sounds almost bizarre. Like passing a flame from torch to torch, a person, once having accepted the "challenge" to write some treatment, would turn quickly to the next in line and challenge him to contribute another treatment, until all had accepted "mutual voluntary pledges" to prepare some part(s). The Russian version (10) reads quite differently, however, and seems to suggest that the pledges were something less than voluntary. Here Bobrov speaks of the widespread "socialist rivalries" and hints at the need for the botanists to attest publicly to their enthusiasm for their assignment by making a show through the mutual "socialist challenges." Apparently, every "volunteer" had an obligation to enlist at least one other "volunteer."

In January 1931, Fedtschenko formally submitted a 5-page memorandum detailing a concrete plan for the *Flora* to a local "productivity conference," chaired by Bobrov; V. I. Kreczetovicz, who was later to prepare the treatment for the genus *Carex* (vol. 3), was secretary. Basing his calculations on the assumption that the total flora of the USSR would number about 15,000 species—an amazingly accurate estimate of the final total (17,520) considering how poorly known much of the USSR was at that time—Fedtschenko anticipated a work of 16 volumes, each consisting of two parts. The distribution of species in the USSR was to be indicated according to 30 phytogeographic divisions, and 1500-1800 original drawings were planned. The *Flora* was to be completed in 5 years (1931-35), and this called for some hard arithmetic. The Herbarium's author-pool totaled 23—14 "botanists" and 9 "scientific workers"—and Fedtschenko had estimated how many species these 23 authors could write up in a year's time.

Every botanist would be able to prepare the text for at least 100 species a year—50 during regular working hours and another 50 during compulsory overtime—and every scientific worker would be able to write up at least 50 species a year, according to the same formula. Actually, Fedtschenko assumed that many of the authors would exceed these figures because he calculated that his collective could prepare descriptions for 2500 species a year or 12,500 in 5 years. This left 2500 species for specialists at other institutions to do during the 5-year period. The whole work was to be directed toward the needs of the economy by including a section after each species dealing with economic uses (9, 10).

Birth of Project

Fedtschenko's memorandum was turned over to an *ad hoc* committee (Bobrov, Iljin, Juzepczuk, Kreczetovicz, Voronov) for detailed examination, and its recommendations were reported back to a larger session of the "productivity conference" in early February 1931 (9). The committee recommended that the projected size of the work be halved—to eight two-part volumes; that the species descriptions be kept short so that two or three could fit on one printed page; and that the original illustrations be kept to about 1000 (10). Room was allowed in their thinking for a much larger flora (up to 25,000 species), and they suggested that botanists from all over the Soviet Union be solicited to participate. The Project was to be administered by an active editorial committee of seven to nine botanists from the Botanic Garden. At this enlarged productivity conference, Academician B. A. Keller, who was soon to head the newly formed Botanical Institute, suggested that a detailed draft proposal be placed before the First All-Union Conference of Geobotanists and Plant Taxonomists, to

be held in 2 weeks (February 25, 1931⁵²). An urgent "shock brigade" (Bobrov, Fedtschenko, Juzepczuk, Kreczetovicz, Petrov, Roshevitz, Voronov) was appointed to work up the detailed draft and to prepare the "Map of the Regions of the Flora of the USSR." They were instructed to consult with Academician V. L. Komarov, who had served as head of the sister Department of Living Plants at the Principal Botanic Garden since 1917 and had only the past year been elected to succeed Borodin as director of the Botanical Museum of the Academy of Sciences.

The All-Union Conference (Feb. 25–Mar. 2, 1931) heard two reports, prepared by the "shock brigade." The first, "Objectives and Tasks of the *Flora URSS*," was given by Komarov, and the second, "The Procedure of Work for the *Flora URSS*," by Fedtschenko (9). The Conference, which also dealt with much other business, approved the *Flora* Project and put the great effort under way. On March 27, at a special meeting of the *Flora* Project, Komarov was nominated by Keller to be editor-in-chief and was elected. Shortly thereafter Bobrov was appointed secretary of the editorial committee. Initially, the editorial committee included representatives from 11 cities of the Soviet Union, and it was intended that this committee would be a working committee. However, complications soon arose, and the idea of committee leadership had to be abandoned (10). Takhtajan *et al.* (5) blame some of the problems of the *Flora* Project on inadequate organization. Too much work fell on too few people. Basically, the organization consisted only of the editor-in-chief and the secretary. Although each volume was signed by one or two so-called "editors of the volume," in addition to the contributing authors, Takhtajan *et al.* claim

⁵²The year of this meeting is incorrectly given as 1932 in the official chronology of Lebedev (2, 8) and in the paper by Fëdorov (3).

that their editing work was limited. Perhaps this was true in most cases, but it seems clear that the work of Bobrov and B. K. Schischkin as editors of volumes was substantial. Takhtajan *et al.* attribute the lack of uniformity in space allotted to species (varying from part of a page in early volumes to two full pages in later ones), and the slowness with which the *Flora* came out, to the inadequate editorial organization. Mismanagement reached such a point, they say, that some Latin diagnoses printed in the Addenda of the *Flora* were published a second time in one of the taxonomic periodicals of the Institute.

The second half of 1931 was spent working out the mechanics of the Project and preparing sample descriptions. A rigid program was planned in the beginning for the contents and sequences of the volumes, and according to Bobrov (9) this program was strictly adhered to throughout the whole Project. It should be observed, however, that the later volumes did not come out in sequence, although perhaps it was planned this way from the beginning. Several volumes were always in various stages of preparation simultaneously, but "particular attention was always directed to the one or two volumes that were next in turn."

The merger of the Principal Botanic Garden and the Botanical Museum in late 1931, continuing for 5 months into 1932, interrupted *Flora* activities for a time and placed the Project in a new context. The whole idea of *Flora SSSR* had been conceived at the Garden, and, until the merger began, the planning had been conducted by Fedtschenko and his staff in the Garden's herbarium. Once it became known in 1931 that the merger would take place the theater and cast for *Flora SSSR* changed somewhat. Komarov, who as academician and former head of the Botanical Museum (and its herbarium) outranked Fedtschenko, was to become the head of the newly formed Botanical Institute's Department of Systematics and

Geography of Vascular Plants, which administered the combined herbaria. It must have been in anticipation of this merger that he was made editor-in-chief of the *Flora*. At any rate Komarov quickly came to dominate the *Flora* Project.

Komarov was a teacher and theoretician whose taxonomic philosophy was to become the hallmark of *Flora SSSR*. According to Bobrov (9), Komarov's students "formed the majority, as well as the most active, of the authors," and he provided the "progressive method of investigation." Fedtschenko, on the other hand, is featured by Bobrov as the costar of the Project because of his more than 25 years of background activity in the herbarium which made the *Flora* possible. Komarov continued as supervisory editor until his death in 1945. Afterwards, Schischkin carried this responsibility although he was never so credited in the volumes that were issued. Altogether, Schischkin's contributions were enormous (pp. 75, 156).

Early Work

In the spring of 1932, after the merger was completed and the botanists could get down to the serious business of research again, work on *Flora SSSR* finally began in earnest. The manuscript for the first volume was placed in the hands of the printer in December of that same year. This volume was released in early 1934, as the manuscript for volume 2 was going to the printer (2, 8). Of the seven contributors to the first volume—Bobrov, Iljin, Komarov, Krishtofovich, Fedtschenko, Fomin, and Juzepczuk—only Bobrov, who was 32 in 1934, and Iljin, who was 45, are still living today. Schischkin's long and intimate association with the *Flora* began with volume 2, to which 14 authors contributed. This volume was issued in late 1934. Schischkin was to sign nearly every succeeding volume either as editor, author, or both. The ground rules

for *Flora SSSR* were enunciated by Komarov in the preface to volume 1 (37).

Depending on available funds, it was hoped that the *Flora* could be published at the rate of 1-3 volumes per year. At first the writing moved along rapidly, and some authors completed their manuscripts far ahead of schedule. Kreczetovicz had prepared a treatment of 400 species of *Carex* in a record time of 2 years. By the time that volume 2 appeared the manuscripts for the next two volumes were already in the hands of the printers. Then bottlenecks in publication developed and other problems arose. The initial success of the Project filled the authors with new zest, but quite naturally the work began to uncover unforeseen obstacles, and conflicts arose over policy and especially over the general concept of the *Flora* (see below). Bobrov (9) indicates that there were "many incidents," which "were always relatively easily settled, since the entire work was being done under the gaze of all authors, and under the attentive supervision of the productivity conference which assembled once or twice a month to discuss the work in progress."

In his Russian report Bobrov (10) gives us slightly more insight into the nature of these conflicts. Serious original research was discouraged, and those who ignored this official attitude often found themselves in deep trouble if their studies had turned up much new material and resulted in radical departures from previous treatments. For this reason S. A. Nevsky's treatment of the Tribe Hordeae (barleys) required a long time for approval, and V. I. Kreczetovicz's treatment of *Carex* for volume 3 was held up 2 years (10). He had divided the 400 species into 47 sections, which departed radically from the previous classification by Küenthal, and he pleaded repeatedly with the editors to let him treat the 47 sections as separate genera. But Editor-in-Chief Komarov was implacably

opposed to this (fortunately!), and finally 2 years later Kreczetovicz came around to his point of view. Even then Kreczetovicz's arrangement was still so different that the editors felt constrained to warn the public in their preface to the volume: "Independence in scientific investigation is important; the people using our *Flora* should therefore not complain about the unfamiliar order in the classification of sedges."

The *Flora* Project was conducted at all times under the watchful eye of the Communist Party and was constantly being held up for public scrutiny (9, 10). The 1931 All-Union Conference of Geobotanists and Plant Taxonomists was controlled to some degree by several vigilante communist groups, and at one of the productivity conference meetings certain representatives of the "Com-Academy" proposed that the *Flora* Project be run by the organization that was producing the Soviet Encyclopedia (10), because the "Com-Academy" thought that the *Flora* should have an ideological side to it. The most serious threat, according to Bobrov (10), came in 1936 when certain persons charged that the *Flora* was being written according to the "Fascist System," because the editors had announced in the preface to volume 7 that Engler's System of arranging plant families was adopted for the *Flora*.

At the outset there was considerable divergence of opinion about the nature of *Flora SSSR* (9, 10). Komarov argued for preparing a *synoptical* flora, drawn together largely from existing materials and information, because time was too short to prepare monographic treatments based on new fieldwork and critical research. Fedtschenko did not agree altogether with this point of view, and Bobrov (9) stresses that the "overwhelming majority of authors were vigorously opposed to writing surveys and were inclined to make a critical review of the material." Komarov's viewpoint prevailed initially, and the accounts of the Pteridophyta, Coniferae, and some genera

of Gramineae in the first volumes were merely synopses. Gradually, however, the will of the majority began to prevail; the authors simply did not heed the official concept, and proceeded to study their groups in critical detail. "This, of course, required far more work and time. Consequently it became clear that the five-year period initially planned for the work should be at least doubled, or more probably trebled" (9). The authors knew, after all, how little was known about the Russian flora, and they could not in good conscience stop short of all-out revisional or monographical efforts in most genera. Fortunately perhaps for all concerned, the charter participants were optimistic, and none was able to foresee just how long (33 years) and how difficult the whole project was to be. What started out to be a brief conspectus of the Russian flora proved in the end to be a major systematic treatise, almost monographic in character, with hierarchical classification, complete keys, extensive synonymy and literature citations, long descriptions of the taxa, some taxonomic discussions, geographic distribution, flowering time, and notes on fossil records, economic uses, etc. Starting with volume 2, Latin diagnoses for new taxa described in the Russian text were appended to the end of each volume, so as to conform to international conventions on nomenclature.

Komarov's Leadership and Methods

The guiding taxonomic philosophy throughout the preparation of *Flora SSSR* was that of Komarov, who sketched his philosophy in the preface to volume 1 and later articulated it at length in a prize-winning paper, mentioned previously (see p. 90). As chief scientific editor and mentor during the crucial early years, he authoritatively set a course from which his successors did not deviate appreciably. Komarov introduced the

geographical criterion into Russian taxonomy and developed what Bobrov (9) terms the "morphological-geographical method." To Komarov the geographic race was a real biological entity which he regarded as the species, and he promoted what in essence was a geographical concept of species. Integral to this concept was his presupposition that the species is the indivisible primary unit in nature (5). Recognition of local, morphologically homogeneous races as distinct species followed naturally from his insistence on *monotypic* species. On this point, Bobrov (9) writes, "The most characteristic feature of the *Flora URSS* is the monotypic concept of the species."

A companion tenet of Komarov's species concept was his belief in the "series" as a group of genetically related, geographically vicariant species. Accordingly, a specialist working up a taxonomic group for the *Flora* would first describe the basic racial units or "species," and then if the group was large and diverse he would attempt to arrange these species in two or more "series" expressing their true relationships. Komarov believed that classification should be phylogenetic, and he encouraged efforts to group species of common ancestry into ever larger hierarchical taxa. All the large genera in the *Flora* are divided into one or more infrageneric categories, and numerous new subgenera, sections, subsections, and series are described and typified. Schischkin (in 8), writing about the extensive delineation of new series, said that this feature represents the original contribution of *Flora SSSR* to systematics in general.

Application of Komarov's species concept led to much taxonomic splitting. Morphological variants were either ignored or elevated to species. With one or two exceptions (e.g., Bobrov's account of *Trifolium*), subspecies are unrecognized in the *Flora*, and varieties are recognized in only a few genera throughout the work. Thus, in general it is a flora without

infraspecific taxa. By contrast Komarov himself had used varieties in his earlier floristic work.

Concerning the policy of the *Flora* on infraspecific taxa, Schischkin (*in 8*, p. 91) wrote:

The complicated nomenclature being used in many publications in the West, according to which the species is divided into subspecies, the subspecies into varieties, the varieties into smaller taxonomic entities, was not accepted, as it did not correspond to the established species concept in the 'Flora.' (Translation mine.)

In many genera, the application of the morphological-geographical method resulted in a sound, practical taxonomy delineating a credible if supernumerary list of species. The average results are probably about the same as if a straight morphological criterion had been applied, although introduction of a geographic criterion helped in no small number of cases to justify species that on purely morphological grounds would have been defenseless. The method foundered where any strictly classical method would have run aground, namely, in groups beset by complicated biological problems such as apomixis and hybridization. Some would criticize Juxip's 785 species of apomictic *Hieracium*, for example, although within the framework of the method and given the enormous problems his treatment is probably not unreasonable.

The wholesale use of series in the *Flora* had the effect of transferring many real biological problems one step above the species level. As Takhtajan *et al.* (5) point out, many of the series were nothing more than single, polymorphic species. Thus, for working purposes, the series of *Flora SSSR* are often the only useful primary units. This is especially true when using *Flora* treatments in connection with studies of circumpolar plants, because noted foreign specialists of the same period (E. Hultén, N. Polunin, others) have adhered to relatively broad species concepts in their works. It should be mentioned, however, that Tolmatchev is adopting similarly broad

views in his "Arctic Flora of the USSR," which has begun to appear (p. 57).

Soviet botanists themselves have freely admitted the excesses to which some authors carried the Komarovian method, and they have been critical of those, who, in the interest of species-splitting, lost sight of the "true" Komarovian concepts (5, 9, 10, 36). Takhtajan *et al.* (5) note that the uncritical elevation of all forms to species often produced "atomic" species which in fact were subraces of less significance than ecotypes; Komarov did not intend this. The use of series was very inconsistent from one author to another; some authors used them only mechanically, with quite artificial results. Bobrov (10) laments this and says that those authors should have refrained from using series, because they only succeeded in masking the true genetic relationships and in casting doubt on the method itself. Takhtajan *et al.* believe that the time has come to reevaluate the taxonomic rank of many species that have been described by Soviet botanists during recent decades. The series is still a useful category, but they believe it should be reserved for closely related species that are well differentiated morphologically and genetically, not for poorly differentiated, vicariant geographic races.

Both Bobrov and Takhtajan *et al.* consider the Komarovian method to have been progressive and right for *Flora SSSR*. Because Komarov broke away from the purely morphological criteria of previous Russian taxonomic work and focussed attention on geography and evolution, one must agree that his method was progressive for his time. Takhtajan *et al.* stress that the great positive contribution of his approach was that it stimulated detailed study of the native flora of the USSR and brought to light many interesting local populations that otherwise would have been overlooked. Bobrov (9)

makes an especially cogent argument for the geographical emphasis of the Komarovian method:

The fact that the morphological-geographical method was generally adopted, and is still developing in the U.S.S.R., is by no means fortuitous. Those who live and work in the U.S.S.R., this immense country stretching from the Atlantic to the Pacific and from the Arctic tundras to the sub-tropical zone, cannot but think in terms of geography. One cannot avoid meditating on the distribution of plants over this vast territory, seeing actual species-races which have become differentiated geographically in the course of evolution, proceeding not only in time but also in space.

He then goes on to say that Soviet botanists have themselves to blame for the fact that the Komarovian concepts on which *Flora SSSR* is based are so misunderstood abroad, "since we have never taken the trouble to expound our concepts in sufficiently coherent form for our foreign colleagues."

In defense of Soviet botanists and their work in *Flora SSSR* it must be emphasized that the Komarovian method did not lead to the extreme excesses that one might have expected in a floristic study of such a vast, relatively unexplored territory. Less than 10 percent of the total number of species (1500:17,520) were described as new in the course of the 33-year research, and this is a modest figure considering how little was known about much of the native flora at the outset. To be sure, many previously described segregates were recognized which otherwise might have been combined, but here the method was "conservative" in the sense that premature judgments were not passed on poorly known species—the species were simply allowed to stand. Thus, in retrospect the morphological-geographical focus of *Flora SSSR* seems right and necessary. It was necessary in the first round to elucidate the details before the broad trends could emerge in a second round. Perhaps the only real regret in this connection is that the task was not consistently done, and today,

therefore, the racial composition of the Russian flora is not completely worked out and never will be, Bobrov thinks (9).

The completion of *Flora SSSR* brought the end to an era in Soviet taxonomy, the Komarovian Era, or at least so it seems to an outsider even though Soviet botanists would not fully agree. Through the medium of the *Flora*, his teaching, and his activities in the Botanical Institute and the Academy at large, Komarov stamped his taxonomic philosophy on a whole generation of taxonomists and profoundly influenced the course of descriptive botany in the Soviet Union for more than three decades. Among his more illustrious disciples the late S. J. Juzepczuk especially should be mentioned. There were years when Komarov's ideas seemed to take on the aura of dogma, although his views certainly were not shared by all Soviet taxonomists. The eminent student of the Siberian flora, M. G. Popov, held very different concepts, and there was N. I. Vavilov's⁵³ school of thought which in many respects was diametrically opposed to Komarovian ideas. Also, such noted Russian botanists as A. A. Grossheim and B. M. Kozopoljansky took issue with some of Komarov's philosophy. Thus it probably is not fair to equate Komarov's influence in Soviet taxonomy with Pavlov's in biomedical science (38) or Lysenko's in genetics and agriculture. At the same time it can hardly be denied that at least in some quarters Komarov's teachings were treated as authoritative, and his philosophy took on the character of an "ism." For example, Bobrov (9) writes:

The authors of the *Flora URSS* clearly realize that the methodological basis of their work is dialectical materialism. They realize that Komarov's concept of species developed from pure Darwinism. They also, of course, understand that Darwinism and Marxism

⁵³Vavilov, N.I. 1951. The origin, variation, immunity and breeding of cultivated plants. Selected writings of N.I. Vavilov, translated by K. Starr Chester. *Chronica Botanica* 13: 1-366.

are, as it were, two sides of the same coin. They know, too, that their method of investigation cannot become outdated, since Darwinism itself cannot become outdated.

Preparation of the *Flora* naturally required a certain degree of uniformity in species concept, and, therefore, it is not surprising that Komarov's influence was greatest in the Botanical Institute where the major part of the work was going on. Furthermore, his fertile ideas added an all-important sustaining intellectual dimension to research that otherwise could have become hopeless drudgery. In the end it was probably the strong, by times almost dogmatic influence of Komarov that gave the *Flora* unity and kept the Project from falling apart during all the difficult years.

Takhtajan *et al.* give full credit to the timeliness of Komarov's morphological-geographical methods and stress his great contribution to the general development of Soviet taxonomy and especially to *Flora SSSR*, but at the same time they take issue with his monotypic species concept as being outmoded today in the light of modern population genetics and biosystematic research. They believe that a *biological* concept of species is necessary and call for recognition that some species consist of many geographic races, ecotypes, or other kinds of polymorphic populations. They remind Soviet botanists that Komarov's concepts must be squared with the concepts of other Soviet biologists like N. I. Vavilov. Even Bobrov, though more of the "old school," is fully aware of the great biological complexities introduced by apomixis, hybridization, etc., which were not fully comprehended in *Flora SSSR*, and he calls for the use of new methods (9, 36).

Authorship

The editorship realized at the outset that the taxonomists of the Botanical Institute could not prepare *Flora SSSR* within

the allotted time, as Fedtschenko had shown by his preliminary calculations. From the beginning the *Flora* was to be a national project enlisting the aid of taxonomists in universities and in the Academies of Sciences of the Union Republics. Ultimately, however, the bulk of the work fell on the Institute's botanists. Here, after all, is where most of the necessary collections were held.

Altogether, about 100 botanists collaborated in the writing, although about a third of these contributed to only one volume. The active nucleus was comprised of 20-30 authors (5). Some of those who contributed to only a few volumes, e.g., Roshevitz (Gramineae), Fëdorov (Campanulaceae), Juxip (*Hieracium*), nonetheless contributed very significant treatments, in some cases writing a whole volume or nearly so. About two dozen authors contributed to five or more volumes, and the following seven contributed to ten or more: E. G. Bobrov, A. G. Borisova, S. G. Gorschkova, S. V. Juzepczuk, A. N. Krishtofovich, B. K. Schischkin, and I. T. Vassilczenko. Bobrov, Borisova, and Gorschkova are now retired, and Vassilczenko is chief curator of the Vascular Plant Herbarium. The other three are no longer living. (For a complete statistical breakdown of contributions to *Flora SSSR*, both by author and by volume, see I. Linchevsky, "Flora URSS" [notula bibliographica]. *Nov. System. Plant. Vasc.* 1966, pp. 316-30.)

As already indicated, Bobrov's contribution as author and organizer was enormous, and Schischkin was one of the real "work horses," who personally prepared the text for 1347 published pages of the *Flora*, covering 1446 species (5)! His main contributions were in the Caryophyllaceae and Umbelliferae. Soviet sources place Schischkin second only to Komarov as worker and prime mover in the *Flora*. Through the years, Vassilczenko, a remarkable man, has been one of the Institute's most indefatigable workers, and he was a mainstay

of the *Flora* to the finish. His valiant efforts to keep the *Flora* going during World War II, when the Project reached its lowest ebb, deserve special mention.

Others also deserve mention. N. F. Gontscharov,⁵⁴ who died tragically of starvation during the war, will always be remembered as one of the real heroes of the *Flora* (see p. 101): His and Vassilczenko's efforts during the war are only symbolic of the brave sacrifices made by many at that time (9). The author-pool was seriously depleted by the war, but during the final surge of writing after the war it was replenished from the ranks of energetic younger botanists (An. A. Fëdorov, N. N. Tsvelev, S. K. Tcherepanov, etc.) Also, more botanists from the Academies of the Republics lent assistance (9, 10).

Interestingly, the editorial committee did not depend entirely on specialists to write the *Flora*. Authors were recruited to study various groups that they had not previously studied. Early in the planning the decision was made "that any suitable taxonomist might be enlisted for the treatment of any group" (9). This was to prevent what had happened in the study of such difficult families as the Gramineae (grasses), namely, the development of a "monopoly" of the family by one or two specialists. The editorship wanted to broaden the specialist base by having others acquire the necessary expertise and infuse the subject with their own new ideas. No doubt this practice was encouraged by the Party leadership, who were eager to subordinate the personal aspects of scientific scholarship to the social aspects and to prevent any one person from becoming an indispensable member of the scientific establishment.

Komarov's direct contributions to the *Flora* were limited; he will not likely be remembered in history for the few taxonomic treatments he contributed. Except for those very early

⁵⁴Or, N.F. Goncharov.

years, even his active editing must have been minimal, because already in 1934 he became preoccupied with Academy business (p. 88), although, as editor-in-chief, he did maintain an all-important veto control on policy matters. Yet despite his relatively minor contributions to the printed text, Komarov will go down in history as the author and genius of *Flora SSSR*, which will stand in the annals of taxonomic literature to his everlasting credit. At a time when probably no other scientist in the Soviet Union would or could have performed in his stead, Komarov served the absolutely vital role of public and official advocate-propagandist for the *Flora* Project, defending, explaining, and popularizing it on every hand. As president of the Academy of Sciences during a most crucial period (1936–45), he used this pinnacle of scientific influence to keep his cherished cause on course. One can well imagine the number of times he must have found himself justifying the *Flora* effort to the officialdom, both inside and outside the Academy, especially after the later volumes began to take on the character of scientific monographs rather than brief reference manuals, and the date of completion kept getting more remote. Nothing is so normal and yet so difficult to explain to bureaucratic planners as the scientist's inability to predict the precise duration of his research.

Public Support

Official and public support for the *Flora* Project was intense and enthusiastic in the early years to the point of being meddlesome. Manuscripts were given a public review, and, as indicated earlier, ideological questions were publicly directed to the editorship (9, 10). As a part of the 5-year programs, this Project was a public goal, and its progress was one barometer for measuring the progress of socialist reconstruction in

the Russian scientific establishment. Prior to the war and just after the first 10 volumes had appeared, *Flora SSSR* was given a public citation by the Soviet Government, and a national prize was awarded (3). It is hard to imagine this kind of honor being accorded a flora project anywhere else in the world, regardless how enlightened the national leadership; and to botanists in general, who are unaccustomed to public, not to say political, recognition for their work, such a citation can only be applauded, whatever the motivations. After the war public interest flagged, and the Project lost some of its official luster. Bobrov (9) indicates that the loss of public interest was due at least in part to the passing of Komarov, who had valued popular support highly and had been so effective in encouraging it.

An unusual but interesting feature of *Flora SSSR* related presumably to its public image is the dual use of Latin and Russian binomial names in the keys and descriptive text. Conventional Latin nomenclature is used in the standard way, but in addition there is a complete binomial system of Russian nomenclature. Some of the Russian generic and specific epithets are only transliterations of the Latin epithets, but others are true Russian words of more or less equivalent meaning either by translation or long association and usage. The Russian binomials are not "common names" in the usual sense because many of the species have still other, well known, Russian vernacular names that are unrelated to any system. The Russian binomial system would seem to serve the purpose of standardizing popular plant names for the lay public and particularly for agricultural, horticultural, and other professional workers who often need to know the names of plants but customarily do not use scientific names. Since Russians do not use the Latin alphabet in daily life, the Russian layman would seem to have more than ordinary justification for claiming that scientific names are unpronounceable.

In retrospect, it seems a small miracle that the *Flora* Project continued until the very end to have at least tacit official blessing and support, and that, despite harassments, *Flora SSSR* never fell prey to political intrigue, ideological meddling, or author fatigue.

Significance

It would be hard to overstate how profoundly the *Flora* Project has influenced the orientation and character of Soviet botany in general and the life of the Botanical Institute in particular during the past 35 years. Bobrov (9) says, "It is generally acknowledged that nothing has contributed so much to the further investigation of the plants of the U.S.S.R. as the publication, volume by volume, of the general *Flora* of the U.S.S.R." A great era of national exploration was automatically ushered in. The published *Flora* provided a standard and a source for the preparation of regional (e.g., Union Republics) and local floras, and through the years nearly a score of such "offshoot" floras have been undertaken (5,9,10). Sometimes the imitation has been too literal and uncritical, and the special features of the given region and its plants have not been taken into account. (This is a universal hazard of floristic research.) Takhtajan *et al.* (5) chide those who composed their own regional floras by borrowing mechanically from the *Flora* for misunderstanding its purpose. It goes without saying, they add, that the excellence of a given regional flora is directly proportional to the degree of original research that went into it.

The floristic researches culminating in *Flora SSSR* have brought world fame to the Komarov Botanical Institute, as Bobrov (10) rightly points out, and he predicts that floristics will continue to be important in its future programs. This

optimism is shared by other botanists at the Institute (4, 5). Chater (32), however, sees some uncertainty about the future:

During the last 30 years much of the work of the herbarium has been connected with this *Flora* and influenced by the concepts that evolved during its production. This focus of interest gave the Lenin-grad herbarium its unique value, and now that it is gone, and now that the tradition it encouraged is to some extent breaking up, it is hard to foresee any new unifying project or point of view taking its place.

He points out further that most of the monographic work now being done at the Institute was an outgrowth of studies for the *Flora*. Clearly, the *Flora* Project has provided enormous stimulus for monographic researches going far beyond the scope of the *Flora* itself.

Botanists at the Institute today regard *Flora SSSR* as only one more stage in the investigation of the Russian flora—a new stage of synthesis. “The prospect of further work is enhanced by the fact that we now know the flora of the U.S.S.R. just well enough to realize how little of it we really do know. We now have a clearer idea of the tasks confronting us, such as the preparation of monographs of particular groups” (9). They feel that most of European USSR and significant parts of the Caucasus, Middle Asia, and Western Siberia are floristically well known, but some genuine “blank spots” are to be found in the high mountains of the Caucasus, in Middle Asia, and in Northwestern Siberia. In Eastern Siberia and the Far East there are vast areas where virtually nothing is known (5).

Flora SSSR is widely used abroad, despite the formidability of the Russian language, and foreign botanists are gaining a new appreciation of the great value and significance of this work, now that it is completed. Unfortunately, many of the volumes were issued in very limited editions and almost immediately went out of print so that today full sets are extremely rare and expensive. The early volumes are especially rare, but

the first 13 have now been reprinted by photo-offset in West Germany (1963). Because of the great demand for an English translation, the Smithsonian Institution and the National Science Foundation are sponsoring translations under the "Israel Program for Scientific Translations." The volumes have not been translated in sequence, and thus far only volumes 2 (1963, Gramineae), 3 (1964, Cyperaceae), 12 (1965, *Astragalus*), and 18 (1967, early Metachlamydeae) are issued; volumes 1, 4, 5, and 6 are in preparation. Russian botanists consider volume 2 to be much out of date (Bobrov, 9). Plans are now being made at the Smithsonian Institution for vastly speeding up the translation program, and, in the future, volumes will be translated in sequence.

At least a partial new edition of *Flora SSSR* is contemplated. This will probably take the form of publishing additions and corrections to some volumes and whole new treatments of some families. "Among the families to be revised, the Gramineae, Cyperaceae, Chenopodiaceae, Leguminosae, Rosaceae, and Pinaceae are of particular scientific and practical interest" (9). Chater (32) doubts that any major effort can be made: "There is a shortage of young taxonomists, and of those there are, few are in a position both to appreciate the traditional methods and to relate to them the new techniques."

The *Flora* is not without its shortcomings, as some foreign botanists have perhaps been too eager to point out. Soviet botanists have criticized their own work for many of the same reasons and have been candid in acknowledging the validity of foreign criticism (5, 9). Taken as a whole, *Flora SSSR* shows much unevenness in the extent and quality of its treatments, especially when the earliest volumes are compared with the postwar volumes. What promised to be a diagnostic flora, on the order of the currently appearing *Flora Europaea*, evolved gradually into a monographical flora, on the order of *North*



V. L. Komarov collecting in Siberia about 1920.

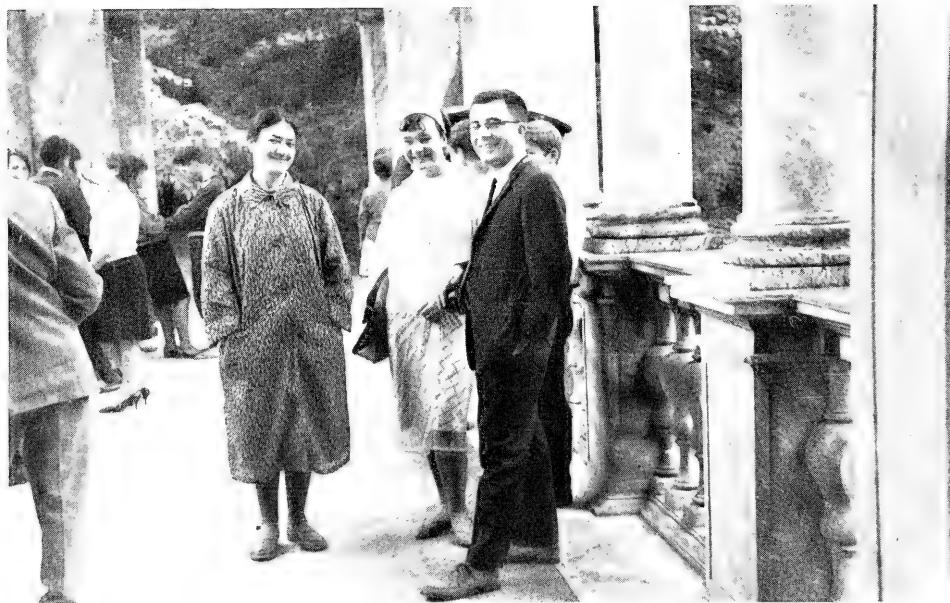


V.L. Komarov examining specimens in herbarium in 1932.



Photograph by S. G. Shetter

Supper in historical park at Pavlovsk, south of Leningrad. From left to right: chauffeur; Evgenia Fëdorov, wife of Professor Fëdorov; Elena Mordak, research assistant of Professor Fëdorov; Professor Andrey A. Fëdorov.



Photograph by Andrey Fëdorov

Waiting out the rain under shelter on grounds of historical park at Pushkin, south of Leningrad. From left to right: Evgenia Fëdorov, Elena Mordak, and author.

American Flora or *Flora Malesiana*. It is clear from what has already been said that this trend was inevitable and necessary, and yet the fact that it occurred suggests that perhaps too little editorial restraint was imposed as a whole. The Project was often hampered by lack of sufficient herbarium collections, and the unequal experience and training of the many authors also contributed to the lack of uniformity. These are pitfalls that can never be avoided completely. As Bobrov (9) says, it is natural "that a large-scale collective work of this kind should involve authors of unequal experience, with different degrees of training, some with their firmly established views and some with their ideas incompletely formulated." Takhtajan *et al.* (5), on the other hand, feel that much of this author inequality can be overcome in future work.

The principal drawback, from the standpoint of the foreign user, is the great imprecision of the geographic information. Most of the phytogeographic regions used in the *Flora* are so large as to be virtually meaningless to anyone trying to comprehend the finer details of plant distribution across the globe. Takhtajan *et al.* state that the *Flora* was very tardy in keeping up with changes in Soviet boundaries. The timelag between the political changes and the *Flora* changes reached as much as 10 years.

The completion of a 30-volume flora is a record achievement any time, but *Flora SSSR* represents a truly unique achievement in the annals of taxonomic research, considering its scope, its virtually monographic character, and the tremendous intrinsic and fortuitous difficulties it had to survive. Thirty-three years are a long time to sustain a research project; profound changes can come to an institution or country during a third of a century, and the best laid plans can easily be trampled by forces completely beyond the control of those who laid them. Never were these hazards more realistic than

they were in the land and time of Stalin's reign. On top of this was the catastrophe of World War II. The task of preparing a complete vascular flora for the entire Soviet Union transcended individual capacity; it had to be done by large-scale cooperation. As they did not fully realize, but time was to prove, this task would outlast the lives or at least the productive careers of virtually every charter participant. Yet somehow the effort was sustained and the task accomplished. The essential ingredients were 225 years of careful groundwork, socialist planning and prodding, single-minded use of Komarovian taxonomic concepts and methods, and above all the dedication of Soviet botanists, especially the dedication of the active nucleus of authors who fought the Project through to the finish. Ironically, *Flora SSSR* was not as much of a collective effort as the fact of the 100 signatories would seem to suggest. It is crystal clear from the accounts of those who were closest to the Project that in the end the *Flora* is really a memorial to a relatively few scientists who, as individuals, had the vision and tenacity to persist.

To this day, the comparable American project to write the *North American Flora*, begun 62 years ago (1905) by Nathaniel Lord Britton (1859–1934) at the New York Botanical Garden, has not yet been completed. When Britton died, his project had already been under way almost as long as *Flora SSSR*, then beginning, has required altogether. Though *North American Flora* has also been a collaborative effort, involving many authors, it has lacked the rigid programming and urgent motivations necessary to see it through, and it lost its own "Komarov" too early in the program. It is possible, of course, that the new series recently begun will bring the project to completion.

Ambitious schemes to carry out long-term researches on a committee basis seldom succeed, at least as first envisioned, and

nearly all of the great taxonomic and floristic works of the past have been accomplished almost singlehandedly by one or two highly motivated and dedicated individuals. In fact some would argue, and with very good historical reason, that floras simply are not produced by committee planning and programing (39). But *Flora SSSR* monumentally demolishes this argument, even if one must confess that at times this *Flora* was more of an individual than a committee activity. Obviously there are formulas that can make the committee approach work, and now we are encouraged to believe, thanks to the team projects producing *Flora Europaea* and *Flora Malesiana*, that these formulas are not peculiar to socialist states. Professor Heywood, in his foreword to Bobrov's article in *Nature* (9), notes with pleasure that the appearance of the final volume of *Flora SSSR* in 1964 coincided with the appearance of the first volume of *Flora Europaea*. He notes also that about the same number of species as described in *Flora SSSR* (17,520) are estimated for *Flora Europaea*. It is to be hoped that the present preliminary planning in the United States will some day culminate in the companion synoptical *Flora North America*, thereby completing the description of the north temperate and arctic floras of the world. The successful completion of *Flora SSSR* has been a major inspiration to the North American botanists who have finally resolved to prepare their own complete *Flora*.

The exemplary *Flora SSSR* is the most outstanding taxonomic achievement of Russian botany down to the present time, and it epitomizes everything that is good about programed research. As Heywood puts it, this *Flora* represents "not only a major scientific achievement but also testimony to the courage, foresight and tenacity of Soviet botanists." American botanists can only salute their Soviet colleagues for such a signal accomplishment. The cause of botany has been advanced

everywhere by the appearance of this colossal compendium on the Russian flora.

SERIAL PUBLICATIONS

With the year 1932, the chief scientific periodicals of the former Principal Botanic Garden and Botanical Museum—*Acta Horti Petropolitani* (1871–1932, 44 vols.) and *Travaux de Musée Botanique de l'Academie des Sciences de l'URSS* (1902–32, 25 vols.), respectively—ceased independent publication, and in 1933 the first issues of the new, consolidated periodical—*Acta Instituti Botanici (Nomine V. L. Komarovii [after 1939]) Academiae Scientiarum URSS*—came out.⁵⁵ This periodical, which began with two separate series, has been the principal outlet of the Botanical Institute for major scientific works ever since. Series I, *Flora et Systematica Plantae Vasculares*, came close to the older *Acta Horti* in content. In the period 1933–64, a total of 13 volumes was issued—one a year at best—but with gaps of up to 6 years between volumes and averaging, therefore, less than 1 volume every 2 years. Series II, *Plantae Cryptogamae*, has had a similar record since 1933. These series became the publication outlets for the Departments of Vascular Plants and Cryptogamic Plants, respectively. As the need arose in other departments for publication media, more series were added gradually to

⁵⁵Cf. also pp. 37, 59. These are the titles by which the three serials are known abroad. The Russian titles, as of 1932–33, were Труды Главного Ботанического Сада РСФСР (*Trudy Glavnogo Botanicheskogo Sada RSFSR*), Труды Ботанического Музея Академии Наук СССР (*Trudy Botanicheskogo Muzeya Akademii Nauk SSSR*), and Труды Ботанического Института (им. В. Л. Комарова) Академии Наук СССР (*Trudy Botanicheskogo Instituta (im. V. L. Komarova [after 1939]) Akademii Nauk SSSR*), respectively. In Russian sources, these three periodicals are referred to simply as the *Trudy* (= *Acta*, *Travaux*, or “Proceedings”) of the Botanic Garden, Botanical Museum, and Botanical Institute, respectively.

the *Acta Instituti Botanici*, until there are now eight series. The other six are the following: III. *Geobotanica* (1934–65, 17 vols.);⁵⁶ IV. *Botanica Experimentalis* (1934–66, 18 vols.); V. *Materiae Rudes Plantarum* (1938–67, 14 vols.); VI. *Introductio Plantarum et Viridaria* (1950–62, 8 vols.); VII. *Morphologia et Anatomia Plantarum* (1950–62, 5 vols.); and VIII. *Palaeobotanica* (1956–64, 5 vols.).⁵⁷ Obviously, this periodical embraces all phases of the Institute's work. Large papers, monographs, and full-length books appear in the various series.

Some departments had their own periodicals besides *Acta*, the institutional periodical. The Department of the Botanic Garden continued *Delectus Seminum* (see p. 37). In 1937, the Department of Vascular Plants commenced again to publish its *Notulae Systematicae*, issuing volume 7, the first under the Institute's imprint.⁵⁸ Publication had been suspended by the Principal Botanic Garden in 1926 with volume 6. As before, this periodical carried short taxonomic and nomenclatural papers, which suddenly were in abundant supply once *Flora SSSR* got under way. In 1964, *Notulae* was suc-

⁵⁶All series are continuing, and the number of volumes given here does not indicate a completed run, but only the number issued during the years listed.

⁵⁷These Latin titles are frequently used in Russian sources even though some of the series only belatedly have acquired them, and Series VII has never been published with a Latin title page. Therefore, it is useful to list here the Russian titles: I. Флора и Систематика Высших Растений (*Flora i Systematika Vysshikh Rasteniy*); II. Споровые Растения (*Sporovye Rastenia*); III. Геоботаника (*Geobotanika*); IV. Экспериментальная Ботаника (*Eksperimental'naya Botanika*); V. Растительное Сырье (*Rastitel'noe Syr'e*); VI. Интродукция Растений и Зеленое Строительство (*Introduktsia Rasteniy i Zelenoe Stroitel'stvo*); VII. Морфология и Анатомия Растений (*Morfologiya i Anatomia Rasteniy*); VIII. Палеоботаника (*Paleobotanika*).

⁵⁸Full title after 1939: *Notulae Systematicae ex Herbario Instituti Botanici Nomine V. L. Komarovii Academiae Scientiarum URSS*; in Russian, Ботанические Материалы Гербария Ботанического Института им. В. Л. Комарова Академии Наук СССР (*Botanicheskie Materialy Gerbaria Botanicheskogo Instituta im. V. L. Komarova Akademii Nauk SSSR*).

ceeded by a reorganized publication, *Novitates Systematicae Plantarum Vascularium*,⁵⁹ which does not differ appreciably in format and content. According to Editor I. A. Linchevsky (40), no less than one volume of *Novitates* is to come out each year—a goal that was never met by *Notulae*. In 44 years (1919–63), 22 volumes were published. Linchevsky indicates that the same general types of papers will be carried in the new periodical, and Director Fëdorov (correspondence, 1966) says that the change of title reflects a general tendency to simplify the titles of periodicals, as seen, for example, in the renaming of the Paris *Notulae* . . . as *Adansonia*.

The Department of Cryptogamic Plants resumed publishing its analogous *Notulae* series, begun in 1922, but now of course under the imprint of the Botanical Institute.⁶⁰ Four volumes had been issued by 1926 when publication had been suspended. The Botanical Institute published 12 more by 1963, all but one of them since 1948. Thus, in 41 years (1922–63), 16 volumes have been issued. In 1964, the cryptogamic *Notulae* series was also succeeded by a *Novitates* series.

The Department of Vascular Plants also started again to publish *Schedae ad Herbarium Flora URSS*⁶¹ and to distribute the accompanying *exsiccatae* specimens, begun at the former Botanical Museum at the turn of the century and suspended in 1922 after the passing of D. I. Litvinow (see also p. 60). Between 1932 and 1957, under the direction of

⁵⁹Новости Систематики Высших Растений (*Novosti Sistemmatiki Vysshikh Rasteniy*).

⁶⁰Full title after 1939: *Notulae Systematicae e Sectione Cryptogamicae Instituti Botanici Nomine V. L. Komarovii Academiae Scientiarum URSS*; in Russian, Ботанические Материалы Отдела Споровых Растений Ботанического Института им. В. Л. Комарова Академии Наук СССР (*Botanicheskie Materialy Otдела Споровых Rasteniy Botanicheskogo Instituta im. V. L. Komarova Akademii Nauk SSSR*).

⁶¹Russian title since 1932: Список Растений Гербария Флоры СССР (*Spisok Rasteniy Gerbaria Flory SSSR*).

Schischkin, the department published booklets 9-14, covering *exsiccatae* fascicles 56-84 (Nos. 2801-4200), and distributed the accompanying 1400 species (50/fascicle). This represented 70,000 sheets (50/species). Altogether, 4200 species and 210,000 sheets were distributed to major national and international botanical centers during the 59 years between 1898, when the project started, and 1957; still, this represented somewhat less than a fourth of the known species of the USSR.⁶² (2; 8, pp. 93, 288)

Finally, it should be mentioned that the Botanical Institute published its own bimonthly journal from 1933 until 1938—*Sovetskaya Botanika*.⁶³ This new journal succeeded the Principal Botanic Garden's *Bulletin (Izvestia)*, published for a total of 32 years (1901-32) and 30 volumes (see p. 38). After 1938, *Sovetskaya Botanika* no longer carried the Institute's masthead, but instead the general masthead of the Academy of Sciences, although the Institute continued, in effect, to run the journal. From the outset it had been open for use to all Soviet botanists. The final volume (vol. 15) was published in 1947, and in 1948 it was united with *Journal Botanique de l'URSS (Botanichesky Zburnal SSSR)* into one bimonthly periodical, *Botanichesky Zburnal*.⁶⁴ This new bimonthly, which became monthly in 1956, replaced *Journal Botanique* as official organ of the All-Union Botanical Society of the USSR, successor to the Russian Botanical Society founded in 1915 (see p. 50). Since the Society functions under the general auspices of the Academy, *Botanichesky Zburnal*

⁶²1898—Booklet 1, fascicles 1-4, species 1-200 (10,000 specimens).

1900-22—Booklets 2-8, fascicles 5-55, species 201-2800 (2600 species; 130,000 specimens).

1932-57—Booklets 9-14, fascicles 56-84, species 2801-4200 (1400 species; 70,000 specimens).

⁶³Советская Ботаника.

⁶⁴Ботанический Журнал.

comes out under the Academy's masthead. The volume series of *Journal Botanique*, which by 1947 had reached volume 32 (1916-47, inclusive), has been continued by *Zhurnal*. Thus in 1965 *Zhurnal* reached its 50th volume, matching the Botanical Society's 50 years of existence. *Zhurnal* is run by an Editorial Board, appointed by the Society, which is headquartered at the Komarov Botanical Institute and dominated by Institute botanists. For example, the journal currently (1967) has three associate editors, and two of these are Institute botanists, namely the morphologist M. S. Yakovlev and the geobotanist B. K. Tikhomirov. A historical sketch of the journal's first 50 years is given in the September 1965 issue of *Zhurnal* in a paper by two other Institute botanists, E. M. Lavrenko and A. A. Yunatov (see footnote 18, p. 51). (2, p. 18; 8, pp. 282, 291)

At present the size of articles is limited in *Botanichesky Zhurnal*, apparently because of a persistent but intensifying paper shortage in the Soviet Union—an anomalous situation in a country of such vast timber resources. This shortage has required size-economies that seriously threaten legitimate and necessary scientific publication, and the Botanical Institute has some important work in manuscript right now that could be hurt by these economies. For example, M. E. Kirpicznikov and N. N. Zabinkova have a Russian-Latin botanical lexicon in manuscript that is unique for its rich selection of examples, and one can only hope that their work will be published in its entirety. (32, 41)

INTERNATIONAL ROLE

From the early days of their founding, when Peter the Great imported foreign botanists to direct their scientific activi-

ties and when many of their most important collections originated outside Imperial Russia, the botanical institutions of St. Petersburg-Leningrad have always had a strong international focus and role. Exchanges of fruits, seeds, dried and living plants, publications, and scholars themselves have been conducted more or less systematically—with some notable breaks—for several hundred years. Expeditions have gone out into all parts of Russia and the world, and in return many foreign expeditions have been permitted on Russian soil during the long years. The peak of this activity was reached, probably, during the pre-Revolution years of the 19th and early 20th centuries, when St. Petersburg was a major international center in the erudite commerce of botanical scholarship.

The coming of the Revolution in 1917 signaled far-reaching changes in the scientific activities as in the lives in general of the Russian people, although the changes did not come at once (see next section). The metamorphosis from *Russian* to *Soviet* science was a painful, complicated process involving far more than the mere difference in words can tell. Within a decade scientific activities were sharply reoriented toward much more practical and nationalistic goals than before, and the former international traffic in scholars and scholarship all but dried up. Fortunately, the Leningrad botanical centers were able to maintain some small degree of international contact even in the most difficult years, 1931–44, when Soviet science in general went through its most internalized phase. Whereas in the 1920s botanical expeditions were still being sent abroad, e.g., Juzepczuk's trip to Brazil, and foreign botanists were still being allowed on Russian soil, e.g., Hultén's expedition to Kamtchatka, by the 1930s very little such exchange occurred any longer. At the same time some Russian botanists went abroad, and plant specimens were exchanged between the Botanical Institute and foreign institutions dur-

ing most years of the 1930s. World War II, of course, brought a nearly complete cessation of these exchanges.

This scientific reorientation was partly a natural outgrowth of the new social orientation of the Revolution, giving legitimate if belated attention to the national welfare, but also it was rooted partly in the unfortunate political realities of the later post-Revolution period.

In the postwar period, beginning as early as 1947 when Juzepczuk and Schischkin went to Brazil, the Institute, like the whole Russian scientific establishment, had begun to look outward once again, and the recent history of the Institute is characterized by a new surge of international interest. The tempo of expeditions to foreign regions, especially the tropics, has picked up, and there is renewed participation in foreign exchanges of all sorts. Fëderov (3) points out that quite a few Institute botanists have traveled abroad in recent years and some have stayed abroad 6 months or longer. He also states that many foreign botanists visit the Institute each year, although Chater (32, p. 12), who, like me (1), found no serious impediment for foreign visitors, paints a somewhat more restrained picture on this point:

Considering that the Leningrad herbarium is the second largest in the world, it was surprising to find so few visitors there. Besides myself, the only other foreigner working there for more than a few days, during the [three-month] period of my stay, was a research student from North Vietnam (Luong Ngoc-Toan, monographing the Vietnamese species of *Castanopsis*) in the middle of a three-year visit . . . Visitors even from other parts of the U.S.S.R. were rare.

The story is no doubt very similar for the other departments. If anything, the Herbarium would likely attract more foreign visitors than any other department.

Cooperation and participation in international botanical activities (committees, congresses, joint research efforts) have

increased but still are more token than real, both for the Institute itself and for Soviet botany in general. Thus, while Soviet botanists, including Institute members, have participated in all four postwar International Botanical Congresses (Stockholm, Paris, Montreal, Edinburgh), only token delegations have come to each one. For example, 19 representatives attended the Edinburgh Congress in 1964, 3 of whom were botanists from the Institute. Considering the size of the total Soviet delegation, this was a very good representation for one institution. However, as Institute botanist Tikhomirov points out to his colleagues in a report in *Botanichesky Zhurnal* (30), 19 botanists from the entire Soviet Union was a rather small delegation compared with the total number of 4500 botanists who attended the Congress and considering some of the important disciplines that were not represented in their delegation (e.g., paleobotany and cryptogamic taxonomy).

At one point, the Soviet Academy of Sciences, through the All-Union Botanical Society, had planned to send many more delegates, and 183 persons had submitted abstracts to the Soviet Organizing Committee. Of these abstracts, 144 were approved and sent on to Edinburgh for publication in the program. In the end, only 21 papers were given, unfortunately, and as Tikhomirov also notes, many Soviet chairmen of sessions or symposia failed to materialize; but he takes some comfort in the fact that at least the abstracts were published and will give Western botanists a limited picture of the present scope and progress of Soviet botanical science. When one considers that the Department of Botany of the Smithsonian Institution, which houses the U. S. National Herbarium and is more or less comparable to the Komarov Institute's Department of Vascular Plants, itself sent eight botanists to the Congress—almost half the entire Soviet delegation and nearly three times the Komarov Institute's delegation—then one can

appreciate how minimal was the Soviet participation. It should be added that the Smithsonian sent every botanist of its staff who wished to attend. It must also be said, in defense of the Soviet botanists, that the Edinburgh Congress was almost entirely an English-speaking Congress, and only minimal arrangements had been made for Russian-language participation. Surely the day will come when simultaneous translation equipment will be economically feasible for International Botanical Congresses.

To date, Russian participation in the European project to write *Flora Europaea* has been less than had been hoped for. On the other hand, prospects for Russian participation in the forthcoming International Biological Program (IBP)⁶⁵ appear considerably brighter. Preliminary plans for participation were discussed in March 1965 by the Soviet Academy's Scientific Council that deals with the problem of the "biological basis of rational use, regeneration, and conservation of vegetation," which met at the Institute in Leningrad to consider objectives for the next Five-Year Plan (1966-70). L. E. Rodin, a leading geobotanist at the Institute who has traveled abroad various times, outlined the goals of IBP at this meeting (22). (Rodin took part in the Schischkin-Juzepczuk Brazilian expedition in 1947, and attended the Botanical Congress in Edinburgh in 1964.)

In January 1966, according to Director Aleksandr Fëdorov (correspondence, 1966), the Institute held important discussions on IBP, and a program of action was worked out. Future efforts by the Komarov Botanical Institute and many other institutes of the Soviet Academy of Sciences and the Republics' academies will be governed by this program. A total of

⁶⁵The Russian abbreviation is МБП — Международная Биологическая Программа (*MBP — Mezhdunarodnaya Biologicheskaya Programma*).

55 institutions, including botanic gardens, museums, research laboratories and institutes, etc., are cooperating.

Thus, it is quite clear that participation in IBP will be an integral part of Soviet botanical activities during their next Five-Year Plan.

In conclusion, one can only say that while the Botanical Institute's botanists, like all Russian botanists, have increased their international contacts greatly since the war, the extent of participation and cooperation is still far below a desirable level; the influence they exert on the world community is not commensurate with that to which their achievements entitle them. In particular, Institute botanists have paid relatively few visits to Western Europe and even fewer to North America, and their Western contacts in general and American contacts in specific have lagged considerably behind their expanding contacts elsewhere in the world.

INTELLECTUAL MILIEU

In the preceding pages I have reported and to some degree interpreted the events, accomplishments, and people in the illustrious 250 years that now stand behind the present-day Komarov Botanical Institute. A more fascinating chapter would be the *intellectual history* of the Institute and its mother institutions, unravelling the ideas and forces that have shaped botanical science here and weighing them carefully against the successive intellectual climates of the times, both inside and outside Russia. Above all, nothing is more intriguing to contemplate than the meaning and motivation of science in the modern Soviet period. The temptation to indulge in *detailed* ideological analysis must be resisted, however. For who is qualified to say any more on the subject at this time? Nevertheless, some generalizations are conspicuous.

Few national scientific establishments in the history of science have had to survive a succession of leaderships with such different philosophies of science and to withstand such political and ideological attention as has the Russian establishment. Following the long classical tsarist period, during which the science of Imperial Russia was slowly evolving under much the same philosophy as Western science and was openly borrowing from Western scholarly traditions, the Bolshevik Revolution, particularly after Stalin had consolidated his power, introduced Russian science to a new kind of allegiance, not only to the Soviet State with its manifold needs and wants, but also to the Communist Party with its materialistic and, to a Westerner, downright mystic ideology. While the basic character of these forces has probably not changed appreciably since 1917, nevertheless, to the outsider, there has been a detectable alleviation of the pressures during the post-Stalin years. Partly this is due to the realities of scientific competition.

In the Soviet period much of the responsibility for science has been consolidated in the all-pervasive Academy of Sciences of the USSR. Although numerous researches are also carried out in universities and pedagogical institutes, which fall under the jurisdiction of the Ministry of Higher Education, the Academy occupies the apex of Soviet science, and its members outrank the prestige and influence of university scientists. Indeed, there is a well-known rivalry between the Academy and the Ministry, and an interesting sidelight on the perennial tension between them is provided by Tikhomirov's (30) statistical analysis of Soviet attendance at the 10th International Botanical Congress in Edinburgh. His figures show that university scientists were virtually unrepresented in the USSR's delegation.

The centrality of the Soviet Academy of Sciences⁶⁶ in the direction and management of research and higher learning, particularly during the past 35 years, is hard for an American, familiar with the role of the National Academy of Sciences of the United States, to comprehend. Yet one only need study the history of a member institution like the Komarov Botanical Institute in the context of the history and activities of the Soviet Academy as a whole to appreciate how small is the truly autochthonous element in the program and planning of any subordinate unit of the Academy. Virtually all of a member institution's activities can be traced, ultimately, to decisions and directives of the Academy through its various hierarchical councils. The Academy's actions can be traced, in turn, to directives of the Government and Party.

To digress for a moment, let us analyze the universal forces that shape science wherever it is practiced, before turning more specifically to Soviet science and its influence on the development of the Komarov Botanical Institute.

The development of science is a function of *intrinsic forces* and *extrinsic forces*. The *intrinsic forces* are the forces of historical development within one's own discipline which generate the necessities for current and future research, and the forces of the scientist's own intellect—his training, experience, imagination, curiosity, and creativity. A scholar gets nowhere in his science if he is not a real insider to his discipline, fully initiated into its traditions and cognizant of its historical pro-

⁶⁶I am indebted primarily to the monograph of Alexander Vucinich, "The Soviet Academy of Sciences," which documents the history, structure, and inner workings of the Academy through 1955, for my insights on the Academy (20). For a look at the National Academy of Sciences in the United States of America, see D. S. Greenberg, The National Academy of Sciences: profile of an institution (I), (II), (III), *Science* 156: 222-229 (April 14), 360-364 (April 21), 488-493 (April 28). 1967.

gress so that he can build upon this progress by advancing a frontier that has not already been advanced somewhere else in the world. The moment that the free flow of scientific information is cut off or impeded within the discipline, whether at the personal, institutional, national, or international level, the current necessities of the science are no longer apparent, and the scientist is left with the alternative of either fabricating the current state of affairs on the basis of his own partial knowledge or ignoring it, pretending that progress can come without history. Thus the well-being of theoretical science is so thoroughly dependent upon the constant and rapid exchange of publications and people at all levels that the slightest impediment risks a costly, perhaps fatal ignorance. These are realities.

The *extrinsic forces* are those motivations and demands imposed by society that tend to lead a scientist around "by the nose" from one agricultural, industrial, or social dilemma to another. They are the forces of technology and development that use a little science to make a lot of practice, and they tend to divert the scientist from his theoretical pathways of scholarly research into the stereotyped byways of application. Information exchange is important to the society-oriented scientist, as to the discipline-oriented scientist, but the free flow of information at all levels is never quite so crucial to him. The requirements of society are always relative—relative to geography, climate, previous technological and intellectual development, industrial and economic capacity, nationality, etc.—and this means that applied science, unlike theoretical science, can often be successful on a national or less-than-disciplinewide level. It has a much greater chance of retaining relevance long after becoming ingrown and parochial than has theoretical science, which is fully relevant and viable *only* when it is also fully cosmopolitan.

The extrinsic or social forces have a way of restraining

scholars and keeping them human when they would soar into some esoteric realm beyond the pale of mortal needs, and the best science, surely, is that produced by a scientist who is subject to a happy balance of personal and social research motivations. This balance can hardly be defined, but it would seem that the most successful scientists—from the standpoint of their contributions to theoretical knowledge—are those who are predominantly discipline-oriented, yet have a savoring streak of humanitarian idealism that gives them a sense of higher purpose in their research and a genuine concern for how the fruits of their discoveries and theories will be put to use by society. On the other hand, the scientist who is too much the hand-maiden of society and too little the servant of his profession is not likely to find enough time, cloistered with himself, for producing a significant amount of theoretical science. Thus, it would seem that the scientist in pursuit of research should always allow the intrinsic forces of his discipline to dominate the extrinsic forces of his society.

Some Russian science, in terms of this analysis, has suffered an imbalance of intrinsic and extrinsic forces during the Soviet period, with society dominating discipline and intellect. Officially, Soviet science has no *scholars*, only *scientific workers*.⁶⁷ The difference in words is highly significant in the communist lexicon. Presumably, “scholars” lack social orientation and are selfishly devoted to oftentimes useless, esoteric causes and personal glory, whereas “scientific workers” are altruistic servants of society who understand social realities and use their special skills and privileged status for the good of everyone.

Actually, the difference in philosophy and motivation between the average American “scholar” and the average Russian “scientific worker” is probably not very great. Surely

⁶⁷An even more favored term is scientific “coworkers” (*сотрудники—sotrudniki*).

most Russian scientists are concerned about the personal, intellectual motivations of their science, and, conversely, the American scientist is rare indeed who does not have some social function to perform as part of his total research activities. It is probably fair to say, however, that the average American scientist is more callous toward social pressures calling for collective action to achieve scientific goals than his Soviet counterpart. Thus, to Soviet science must be credited a special *social esprit de corps* and an intellectual solidarity which occasionally have borne enviable fruits (cf. discussion of *Flora SSSR*).

Today Soviet biology is feeling the same currents of change and the same pressures to be fashionable as biology in America and everywhere, although there is perhaps a little lag. Chief among these currents is the decline of descriptive biology and the compensating rise of experimental, particularly "molecular" biology (5, 42). Harking back once again to the Edinburgh botanical meetings (1964), we can see this trend reflected in the makeup of the Soviet delegation, which included *seven* physiologists and *one* taxonomist who was officially listed as a geobotanist (30)! Further evidence, insofar as botany goes, is seen in the decline in the number of taxonomy students experienced in recent years at the Komarov Institute (32). At the same time it is clear from the number of new floristic and monographic efforts that have been started or are being planned for the next Five-Year Plan (1966-70) that the health of descriptive botany in the USSR is still very good, perhaps better than in the USA (5, 9, 10, 22).

The major turning points of the Komarov Botanical Institute have been essentially those of the Soviet Academy of Sciences as a whole. For about 10 years after the Revolution the Bolshevik leaders allowed the Academy to carry on business much as usual, and Academician A. P. Karpinsky (1847-

1936), elected president of the Academy in 1917, remained at his post. Then in 1927 the regime began to "sovietize" the Academy—to subject it to the general socialist reconstruction of the Russian State. Gradually, more and more responsibility for Russian science was consolidated in the Academy of Sciences, which was reshaped as an arm of the Government and Party for prosecuting the State's enormous scientific goals. The old 1836 Charter was replaced by a new one, setting up a typical Soviet organization of hierarchically arranged "councils."⁶⁸

Without warning, the Academy came under criticism and innuendo from the Party in early 1929, and in the second half of the year investigators screened the entire staff from academicians to janitors, and persons at all levels were affected. The Academy was reorganized and many big institutes were created, among which must be numbered the Botanical Institute, created in late 1931. For the first time Party members were elected into the regular academician ranks. Among the new communist academicians, interestingly, was B. A. Keller, the first director of the Botanical Institute (see also p. 72). One must hasten to add, however, that Keller was a well-recognized geobotanist who no doubt had ample scientific credentials for this post. The basic aim in 1929 was "bolshevization" of the Academy: non-Party members in the Academy's hierarchy were selectively replaced by Party members. This was the ultimate step in bringing the Academy under the direct control of the Party and the State.

These events coincided with the beginning of rigorous State economic planning. The First Five-Year Plan, set for the years 1928–32, was not published until 1929, and it was in the middle of this 5-year period that the Principal Botanic Garden and the Botanical Museum were merged to form the

⁶⁸The Russian word *cobet* (*sovet, soviet*) means, literally, "council."

Botanical Institute of the Academy of Sciences of the USSR. There seems no doubt that the creation of the Institute was one of the many aspects of “sovietizing” and “bolshevizing” the Academy. By 1930 the Academy was fulfilling the Government’s order to prepare annual plans of research programs and submit them for approval. Therefore, the Institute immediately faced two requirements calling for rigid planning, goal-setting, and research programing. The first was the need to participate in the 5-year plans and the second to meet the demands for annual plans of operation.

If the Party and Government had not intervened, it is likely that the Principal Botanic Garden and the Botanical Museum, driven by the tremendous momentum of their proud histories and their own cherished programs, would have continued to be independent indefinitely, despite the inefficient overlapping of some of their rival projects. Thus, whatever the consequences at the time, the merger appears in retrospect to have been a good thing. It should also be noted here that in 1930, as a step toward the consolidation of Soviet control over scientific institutions and a prelude to the merger in 1931, the Principal Botanic Garden was placed under the jurisdiction of the Academy of Sciences for the first time in the more than 200 years since the Garden’s beginning.

The consequences of “sovietization” of the Academy were radical changes in research operations and the imposition of strict planning requirements. The subsequent “bolshevization” brought Party control with its ideological restructuring, social orientation, and general conformity.

Following the Academy’s initial reorganization in 1929, business returned to normal, albeit on a new basis. The next big upheaval came to the Academy in the late thirties near the close of the Second Five-Year Plan (1933–37). In 1936, Karpinsky died and Academician V. L. Komarov (1869–1945)

was elected president of the Academy. He was by then a botanist of great distinction. About the same time, Stalin's "great" purge inside Russia began, reaching its climax in 1938. This time *Party members* only were affected. It is significant, therefore, that Komarov was *not* a Party member. The Academy's managerial staff was thoroughly replaced in this period, and the Academy was compelled to devise more stringent means of internally censoring the publications of its members.

The effects of the great purge on the Botanical Institute must remain an unwritten chapter, but a few observations can be made. Keller, a Party member, was replaced as director in 1936, and he seems to drop out of the Russian botanical scene thereafter, although he was reassigned to another directorship in Moscow and lived until the end of World War II (see p. 72). Significantly, however, his permanent successor at the Botanical Institute, B. K. Schischkin, was *not* a Party member. Without doubt the years 1936-38 were years of apprehension, confusion, and indecision for the leadership at the Institute, as throughout the Academy. By the end of 1938, however, virtually all departments had new heads, and business was proceeding on a new footing. In many ways these were tragic years, but soon World War II brought untold new tragedy to Leningrad and the Institute.

It is difficult if not indiscreet for an outsider to evaluate the role of the Communist Party in the present structure and activities of the Botanical Institute, except to note that the Party definitely *does* exert an influence. About half of the scientific staff are Party members, and their membership is a well-publicized fact in the Institute, although they do not often speak openly about it, at least to foreigners. Party membership is clearly optional and carries special responsibilities. Furthermore, as indicated above, at times in the past Party member-

ship has carried special hazards with it. Nevertheless, joining the Party brings decided benefits, and those outside may be discriminated against at the higher levels of leadership. Yet it is only fair to say that through the years the various departmental heads and other leaders at the Institute have in general represented outstanding scientists in their fields, whether they were Party members or not. It would be grossly incorrect to infer that scientific excellence necessarily has suffered because of Party loyalty.

PART 3

A Summary and Postscript

CHAPTER

7

Past, Present, and Future

More than 250 years ago Russia came under the rule of the sometimes fanatic and ruthless tsar, Peter I. But Peter had a vision, and with devoted though uncompromising zeal he turned his vision into reality by forging a cosmopolitan city of science and culture from the raw boreal wilderness on the delta of the Neva River. The creation of Petersburg in 1703 was extraordinary by any standards. For this and other achievements he won himself a permanent place in the hearts of the Russian people. Peter I, the mortal tsar, has become Peter the Great, the immortal hero.

Owing to actions taken by Peter I, a scholarly tradition in botanical research was begun about 1714, almost as soon as the city was born, and this tradition has flourished down through the past two and one-half centuries. Petersburg—later called St. Petersburg, Petrograd, and now Leningrad—soon became the center of botanical as well as other scientific scholarship in Imperial Russia. Today, Leningrad's Komarov Botanical Institute, modern descendant of Peter's original “Pharmaceutical Garden” and *Kunstkammer*, is the foremost botanical institution in the Soviet Union. More than a century after its

founding, Peter's garden, which was started to supply medicinal herbs for his army, was organized into a truly scientific garden, known as the Imperial Botanic Garden of St. Petersburg; and about the same time (1823) the botanical collections of the *Kunstkammer*, a cabinet of arts and curios, were organized into a Botanical Museum of the Imperial Academy of Sciences. The organizing genius of the Garden was F. E. L. Fischer; of the Museum—C. B. Trinius.

The Komarov Botanical Institute was created in 1931 by the merger of Leningrad's two ancient botanical institutions—the Principal (formerly Imperial) Botanic Garden and the Botanical Museum. At this time both were member institutions of the Academy of Sciences of the USSR, although the Garden had just been brought into the Academy the previous year. The new institution was called simply the Botanical Institute of the Academy of Sciences of the USSR, and it was not until 1940 that the Institute was named in honor of Academy President V. L. Komarov, the Institute's most famous botanist and the most respected botanist in the whole Soviet Union until his death in 1945. Since then the full name has been the "Botanical Institute in the Name of V. L. Komarov of the Academy of Sciences of the USSR."

From the date of its merger the Institute has stood in the vanguard of Soviet botany, particularly descriptive botany (taxonomy, etc.), although today its botanists are also leaders in such phases as the study of the ultrastructure of the chloroplast and various other sophisticated physiological researches. However, experimental botany has not been its real forte. The newly formed Institute took over from the mother institutions their historic leadership of the Russian (now All-Union) Botanical Society and its official organ, *Botanichesky Zhurnal*. Here at the Institute has been gathered the largest botanical

staff in the USSR, presently numbering approximately 700 persons, including about 200 professional scientists.

With more than 250 years of history behind it, the Komarov Botanical Institute now ranks among the older botanical institutions in the world and certainly has had one of the richest traditions. Scientific botany in Russia really began here, and one can claim fairly that the landmarks in the history of this institution have also been major landmarks in Russian botany as a whole. Over the long years Russian and foreign botanists have crisscrossed the Asian continent again and again, carrying out extensive explorations and collecting almost unparalleled amounts of data and voucher specimens largely for deposit in the centers of St. Petersburg-Leningrad. Plant specimens alone have accumulated to nearly 6 million so that today the Komarov Herbarium ranks as one of three or four largest herbaria in the world, perhaps second to none. The collections, which date back to 1709, are rich in old and new material. Nearly all of the classical *exsiccatae* sets are represented here. Russian territory has always received the greater attention in the exploratory work, but as early as the 1820s Russian botanists from the Imperial Botanic Garden were reaching beyond their borders to such faraway places as the tropics of Brazil. Today the Institute's botanists are turning more and more attention to the tropics of Asia and Africa. Of especial interest to North American botanists is the fact that the earliest Alaskan explorations were carried out under the auspices of the St. Petersburg scholars, because Alaska was Russian territory until 1867.

The scholars at St. Petersburg were also busy building up a definitive collection of botanical books and periodicals. At present the Komarov Institute's Library contains about 450,000 volumes. It is by far the leading botanical library in

the USSR, to which anyone needing to conduct bibliographic research in Russian botanical literature should automatically turn. At the same time it can justly claim to be one of the foremost botanical libraries in the world, having perhaps a half-dozen peers at most.

The long roster of directors and staff who have served in the Komarov Botanical Institute or its predecessor institutions includes such outstanding botanical scholars as Pallas, Smelowsky, Trinius, Fischer, Meyer, Regel, Ruprecht, Trautvetter, Maximowicz, Borodin, Litvinow, Fedtschenko, Komarov, Krishtofovich, Schischkin, and many others, not to mention the many distinguished living botanists. Similarly, the list of scholarly publications emanating from St. Petersburg-Leningrad through the past 250 years reveals a steady flow of floras, handbooks, monographs, historical papers, vegetation maps, and scientific articles.

The crowning achievement of Russian taxonomy if not of all Russian botany up to the present time is the 30-volume reference manual on the native plants of the USSR—*Flora SSSR* (“Flora of the USSR”), completed in 1964. It includes more than 17,500 species and fills 22,000 pages of text. This work was masterminded and largely prosecuted by the Institute’s botanists, and it was fitting that the Institute’s 250th anniversary (1714–1964) should have coincided with the completion of the *Flora*. The successful completion of *Flora SSSR* almost vindicates the concept of programmed research, repugnant as it is to the individual scientist who cherishes his right to choose the topic, time, place, and method of his own research. The *Flora* Project was completed despite Stalin’s purges and Hitler’s invasion and 900-day starvation blockade of Leningrad in World War II, when more than one Institute botanist slowly starved to death even while conducting research

on the *Flora*. Although few botanists would of their own volition bind themselves to a 33-year, institutional research program, the merit of the end product is overwhelming and speaks entirely for itself. Professor Heywood, in his foreword to Bobrov's article in *Nature* (9) on the history of the *Flora* Project, sums up the story very well:

In these days when there is considerable interest, not only in science but also in the ways in which science and scientists organize their work, the following account by Prof. Bobrov of the history and details of the planning and execution of the *Flora URSS*, often under conditions in which sheer survival must have been many scientists' main pre-occupation, constitutes an important and fascinating contribution to the history and sociology of science.

In early 1966, *Flora SSSR* was accorded the very high honor of being recommended for a Lenin Prize.

On December 15–18, 1965, the Komarov Botanical Institute officially celebrated its 250th anniversary in a special 4-day symposium held in the Leningrad Philharmonic Hall. About 2000 botanists attended from Leningrad's scientific institutions and from many cities throughout the country, representing 15 Union Republics. Distinguished foreign botanists bringing greetings to the meeting included K. Motes and H. Stubbe (Germany), R. Soó (Hungary), D. Iordanov (Bulgaria), E. Pop (Rumania), and T. Ahti (Finland). Academician A. L. Kursanov represented the Soviet Academy of Sciences, and the Mayor of Leningrad, V. J. Isajev, acting on behalf of the Presidium of the Supreme Soviet, awarded the Institute the "Order of the Red Banner of Labor." This high award was officially signed on October 6, 1965, by then-President Anastas Mikoyan, and the accompanying proclamation took note of the Institute's great service to the cause of biological science during the past 250 years. This official proclamation is published with appropriate remarks

as a preface to the November 1965 issue of *Botanichesky Zhurnal*.⁶⁹

Today there is every indication that Soviet botany with its experimental branches aggressively developing as in the West is also experiencing the same philosophical and theoretical ferment. Russian botanists seem to be less confined by official dogma (e.g., Lysenkoism) now than at any time in recent history.

The latest Five-Year Plan (1966-70) calls for redoubled efforts in every established branch of botany and for the development of new methods and directions of research. The Komarov Institute's own program (22) is to be intense and varied. It calls for vast new efforts in floristics, systematics, and geobotany, and anticipates an important role in the International Biological Program (IBP). More stress is to be laid on the study of infraspecific variation and evolution, and on all modern methods in systematics. Research in anatomy, morphology, and embryology are to be strengthened, and new departures in the realms of phycology, mycology, lichenology, and bryology are anticipated.

Surely these goals will not all be attained, but the general health of descriptive botany clearly seems destined to remain at a high level. Classical methodology has persisted more stubbornly in Soviet than American botany. Notwithstanding certain unfortunate consequences of this, it is important to take note of the valuable dividends. Soviet botanists seem to be able to consolidate and continue major historical efforts to explore, describe, and map native floras and plant communities, and, furthermore, these goals apparently are still fashionable. The new 5-year program seems to insure that Soviet botanists

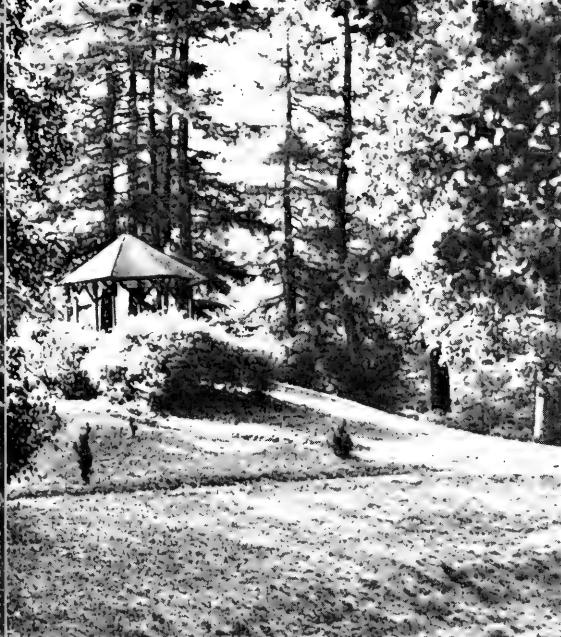
⁶⁹Information on this celebration was provided by a *Tass* news bulletin of December 15, 1965, relayed to the Smithsonian Institution by telegram from the American Embassy in Moscow, and by Director Al. Fëdorov in correspondence, March 1966.

will be pressing their hallowed socialist trinity of biological goals—exploration, exploitation, and conservation—with even greater zeal and vigor. In an era when American botanists are becoming self-conscious about the value of herbaria, Soviet botanists are talking about creating a whole new network of regional herbaria (4).

If there is any realm in which Soviet botanists are likely to face American botanists with an effective challenge in the coming years, it is in the realm of tropical biology. In recent years many Soviet botanists, both from the Komarov Institute and from other Soviet institutions, have gotten a taste of tropical research through firsthand experience, and it is clear that we have barely seen the beginning of Soviet activity in the tropics. Apparently there will be a large Soviet tropical effort in IBP. Because much exploratory research on the tropics must necessarily proceed along classical lines, Soviet botany may actually be in a better posture today for tropical studies than American botany, owing to the stronger persistence of classical methodology and the greater sympathy for herbaria in the USSR. The herbaria are the national "archives" that must be "stuffed" for future study before it is too late. It is clear that the gathering race among all biologists to study the tropics while they can is going to highlight the critical shortage of descriptive biologists of all types and give the lie to the arguments of those who do not find enduring value in the more descriptive aspects of biology. In this "race," we may find that the philosophical conservatism of Soviet taxonomy will suddenly prove its strongest asset. In any event, we can only hope that it will be a friendly race and that the IBP will bring much fruitful cooperation between Soviet and American colleagues, since neither we nor the Russians have full access to all tropical regions of the world, and we can both profit greatly from cooperation.

There is good cause, I feel, for hoping that cooperation between American and Russian botanists will continue to increase. The general realization is growing on all sides that scientific cooperation is essential and that in most areas of science it can take place without first achieving political community. The language barrier is still a formidable one, but modern technology is rapidly providing ways around this impediment. All considered, the present time seems more auspicious than any time in the last several decades for increased exchange and cooperation.

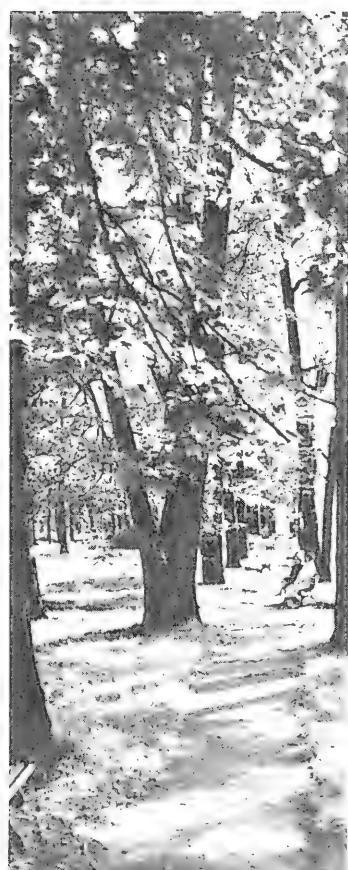
It is my hope that this short history of the Komarov Botanical Institute will help acquaint a wider group of American and other non-Russian botanists with the rich tradition of botanical scholarship during the past 250 years in the city of Peter the Great. The Komarov Institute is truly one of the world's great botanical centers, and no botanist, indeed no biologist, should be unaware of its great resources. Today the Institute is quite accessible to foreign botanists, and it is a great shame that so few take advantage of this. Opportunities for exchange and collaboration seem at present to be limited primarily by our own initiative and patience. The scientists at the Institute, from Director Fëdorov on down, seem ready and willing to do everything in their power to foster greater contact and to facilitate the work of visiting scholars. If this book contributes in any way toward a greater understanding between Russian and American botanists, its purpose will have been more than fulfilled.



Photographs courtesy Komarov Botanical Institute unless otherwise noted

Scenes in the Arboretum-Park of the Komarov Botanical Institute.

Photograph by Arthur Cronquist





Building of Department of Geobotany, constructed in 1829.



Botanical Museum, housing public displays, completed in 1960.



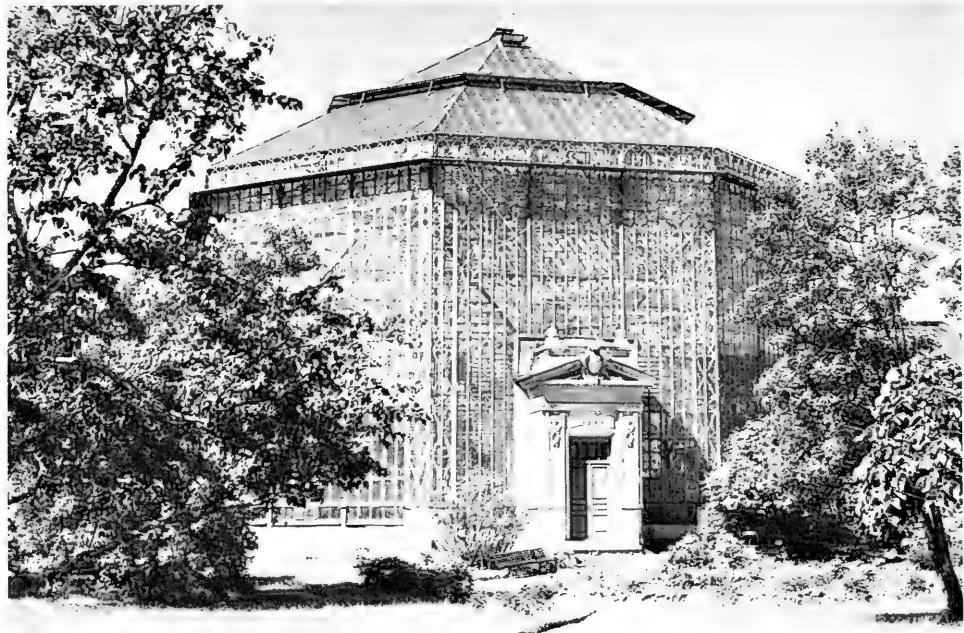
Photographs courtesy Komarov Botanical Institute

Inside views of greenhouses — left, large floating leaves of *Victoria amazonica*; right, part of cacti collection.



Photograph by Arthur Cronquist

Gardeners tend outdoor plantings beside part of extensive greenhouse-conservatory complex of Komarov Botanical Institute.



Palm Conservatory, built in 1899 and restored in 1949.



Interior of Palm Conservatory showing tropical collections in 1965.

*Chronological Table of Significant Events
in the History of the Komarov Botanical Institute
in St. Petersburg-Leningrad*

YEAR	BOTANIC GARDEN	BOTANICAL MUSEUM
1714	<i>Aptekarsky Ogorod</i> ("Pharmaceutical Garden") founded on <i>Aptekarsky Ostrov</i> ("Pharmaceutical Island") in Nevka River by Peter I (1672–1725), as subordinate unit of State Apothecary under Medical Office.	<i>Kunstkammer</i> , which housed some botanical collections, established by Peter I.
1725	<i>Aptekarsky Ogorod</i> renamed "Garden of Her Imperial Majesty Catherine I" (1684?–1727), after Peter's wife, and supervised by Imperial Court.	<i>Kunstkammer</i> affiliated with newly founded Imperial Academy of Sciences.
1735	Garden renamed "Medicinal Garden" (<i>Meditzinsky Sad</i>). J. G. Siegesbeck (1686–1755) appointed director.	
1736	<i>Primitiae Florae Petropolitanae</i> by Siegesbeck issued; 1275 species.	
1742	Siegesbeck leaves, and Garden has no scientific leadership until 1765.	
1765	Johann Falk (1730–1774) named director.	
1768	Martin Terechowsky (1740–1796) named director (first Russian).	
1784		Part 1 of <i>Flora Rossica</i> by P. S. Pallas (1741–1811) issued. (Vol. I, pt. 1, 1784; Vol. I, pt. 2, 1788; Vol. II, pt. 1, 1815.)

YEAR	BOTANIC GARDEN	BOTANICAL MUSEUM
1796	<i>Catalogus Plantarum Horti Imperialis Medici Botanici Petropolitani in Insula Apothecaria</i> , compiled by Terechowsky in 1793, issued; 1406 species. G. F. Sobolewsky (1741–1807) named director; assisted by T. A. Smelowsky (1769–1815).	
1798	Medicinal Garden renamed “Medico-Botanic Garden” of the Academy of Medicine and Surgery	
1799	<i>Flora Petropolitana</i> by Sobolewsky published.	
1801–1802	<i>Sanktpeterburgskaya Flora</i> by Sobolewsky published.	
1806	F. H. Stephan (1757–1814) named director.	
1809	Prof. Jason V. Petrov named director.	
1813	Petrov directorship ends.	
1821	G. H. Langsdorff (1774–1852) and L. Riedel (1790–1861) begin collecting in Brazil (1821–1835).	
1822	Count Razumovsky, patron of Gorenky botanic garden near Moscow, dies.	

YEAR	BOTANIC GARDEN	BOTANICAL MUSEUM
1823	Reorganization leads to formation of "Imperial Botanic Garden of St. Petersburg" under jurisdiction of Medical Department of Ministry of Home Affairs. F. E. L. Fischer (1782-1854) named director. Organized development of herbarium begins; building of greenhouses begins; public exhibit museum is founded.	C. B. Trinius (1778-1844) joins <i>Kunstкаммер</i> staff, curates neglected botanical collections. Botanical Museum established within <i>Kunstкаммер</i> .
1824	Library started.	
1825	Transfer of rarest plants and valuable library in Razumovsky's Gorenky botanic garden to St. Petersburg from Moscow completed.	
1826		Gorenky herbarium of Razumovsky purchased.
1827		Collection of G. F. Hoffmann (1760-1826) acquired.
1828		F. A. Marschall von Bieberstein (1768-1826) collection purchased.
1830	Imperial Botanic Garden of St. Petersburg put under jurisdiction of Ministry of the Court.	
1831-1835	L. Riedel and B. Luschnat send plants from Rio de Janeiro (Brazil) to Garden.	

YEAR	BOTANIC GARDEN	BOTANICAL MUSEUM
1835	<i>Index Seminum</i> with supplement <i>Accendut Animadversiones Botanicae Nonnulae</i> , first taxonomic journal of Garden, begins (presently only a seed exchange list known as <i>Delectus Seminum</i>).	Herbarium moved to new quarters and Botanical Museum formally established as separate institution within the Academy; Trinius named first director.
1842	[<i>Flora Rossica</i> by K. F. Ledebour (1785–1851), who was not associated with either Garden or Museum, published; Vols 1–4, 1842–1853.]	
1844		C. A. Meyer (1795–1855) named director. <i>Beiträge zur Pflanzenkunde des Russischen Reiches</i> first published (discontinued in 1859).
1850	C. A. Meyer named director; only botanist to serve as director of both Garden and Museum; also, second director of both.	
1855	E. A. Regel (1815–1892) named director.	F. J. Ruprecht (1814–1870) named director.
1863	Imperial Botanic Garden of St. Petersburg put under jurisdiction of Ministry of State Properties.	
1866	E. R. Trautvetter (1809–1889) named director.	Ruprecht's "Geobotanical Investigations on Chernozems" published.
1871	First fascicle of <i>Acta Horti Petropolitani</i> published.	C. J. Maximowicz (1827–1891) named director.

YEAR	BOTANIC GARDEN	BOTANICAL MUSEUM
1875	E. A. Regel named director (second term).	
1892	A. F. Batalin (1847–1896) named director.	
1893		S. I. Korshinsky (1861–1900) named director.
1896	A. A. Fischer von Waldeim (1839–1918) named director.	
1898		<i>Exsiccatae</i> distribution of Russian plants initiated by Korshinsky.
1899	<i>Victoria amazonica</i> and palm conservatories completed.	
1900		M. S. Voronin (1838–1903) named acting director.
1901	<i>Bulletin du Jardin Imperial Botanique de St.-Pétersbourg</i> first published.	
1902	“Bulletin of Plant Disease Control” (changed to <i>Morbi Plantarum</i> in 1907) begins.	Academician I. P. Borodin (1847–1930) named director. <i>Travaux de Musée Botanique de l'Academie des Sciences de St.-Pétersbourg</i> , successor to <i>Beiträge</i> , begins.
1912	“Annals of the Experiment Station for Seed-Testing” begins.	

YEAR	BOTANIC GARDEN	BOTANICAL MUSEUM
1913	New Herbarium-Library Building dedicated at 200th anniversary celebration. Imperial Botanic Garden named in honor of Peter the Great at 200th anniversary jubilee.	
1914	[St. Petersburg renamed Petrograd.]	
1915		Russian Botanical Society (now called All-Union Botanical Society) founded.
1916		<i>Journal Botanique de l'URSS (Botanichesky Zhurnal SSSR)</i> first issued by Russian Botanical Society.
1917	Academician B. L. Isatchenko (1871-1948) becomes first "elected" director. Imperial Botanic Garden renamed "Principal Botanic Garden of Petrograd."	Director Borodin serves as vice president of Academy of Sciences, 1917-1919.
1918	Garden renamed "Principal Botanic Garden of the Russian Republic of the USSR" (RSFSR).	
1919	<i>Notulae Systematicae</i> first published (vascular plants only).	
1921	Garden subordinated to the People's Commissariat of Agriculture of the Russian Republic.	
1922	Cryptogamic series added to <i>Notulae Systematicae</i> .	

YEAR	BOTANIC GARDEN	BOTANICAL MUSEUM
1924	[Petrograd renamed Leningrad.]	
1925	Garden assigned "All-Union" importance and renamed "Principal Botanic Garden of the USSR."	
1929	First Five-Year Plan published, charging Garden's Herbarium with responsibility for drawing up plan for a "Flora of the USSR" (<i>Flora SSSR</i>)	
1930	Garden transferred to jurisdiction of Soviet Academy of Sciences. Authors solicited for <i>Flora SSSR</i> .	Academician V. L. Komarov (1869–1945) named director.
1931	B. A. Fedtschenko (1872–1947) submits first formal plan for <i>Flora SSSR</i> . First All-Union Conference of Geobotanists and Plant Taxonomists meets in Leningrad and authorizes <i>Flora</i> Project. V. L. Komarov elected editor-in-chief of <i>Flora SSSR</i> and E. G. Bobrov elected secretary.	
	Principal Botanic Garden merged with Botanical Museum to form the "Botanical Institute of the Academy of Sciences of the USSR."	

YEAR	BOTANICAL INSTITUTE
1931	B. A. Keller (1874-1945) named first director.
1932	First 5 months spent moving collections and books of former Botanical Museum to Botanic Garden on Aptekarsky Island, where new Botanical Institute is located.
	Serious writing on <i>Flora SSSR</i> begins.
	Acta Horti Petropolitani and <i>Travaux de Musée Botanique de l'Academie des Sciences de l'URSS</i> cease publication and the new <i>Acta Instituti Botanici (Nomine V. L. Komarov [after 1939]) Academiae Scientiarum URSS</i> begins, with two series.
	<i>Sovetskaya Botanika</i> , bimonthly journal, begins (successor to <i>Bulletin du Jardin</i> . . .).
1934	First two volumes of <i>Flora SSSR</i> published; Komarov transferred to Moscow.
1936	Academician Komarov elected president of the Academy of Sciences of the USSR.
1936	Keller transferred to directorship of Principal Botanic Garden of USSR in Moscow; J. D. Zinserling and E. G. Bobrov (1902-) serve consecutively as acting directors.
1938	B. K. Schischkin (1886-1963) named director. <i>Sovetskaya Botanika</i> now published under masthead of Academy of Sciences.
1940	Botanical Institute named in honor of V. L. Komarov.
1941	[Blockade period of World War II.]
1944	
1947	First postwar tropical expedition, led by Schischkin and Juzepczuk (Brazil and Argentina).

YEAR	BOTANICAL INSTITUTE
1948	<i>Sovetskaya Botanika</i> united with <i>Journal Botanique de l'URSS (Botanichesky Zhurnal SSSR)</i> to form one bimonthly periodical called <i>Botanichesky Zhurnal</i> , published by the Academy of Sciences as the official organ of the All-Union Botanical Society of the USSR.
1949	V. F. Kuprevicz (1897–) named director (presently [1967] editor-in-chief of <i>Botanichesky Zhurnal</i>).
1952	P. A. Baranov (1892–1962) named director. First volume of <i>Flora Sporovykh Rasteniy SSSR</i> ("Flora of the Cryptogamic Plants of the USSR") published.
1956	<i>Botanichesky Zhurnal</i> becomes monthly.
1960	Reorganization into 24 laboratories. Postwar reconstruction phase ends, including new building for Botanical Museum.
1962	Al. A. Fëderov (1906–) named director.
1963	Dedication of new public displays in Botanical Museum.
1964	Last (30th) volume of <i>Flora SSSR</i> published. 250th anniversary of Institute. <i>Notulae Systematicae</i> , both vascular plant and cryptogamic series, replaced by <i>Novitates</i> series.
1965	Institute awarded "Order of Red Banner of Labor" by Presidium of Supreme Soviet (October 6). Joint celebration of the 250th anniversary of the Komarov Institute and the 50th anniversary of the All-Union Botanical Society of the USSR (December 15–18).
1966	<i>Flora SSSR</i> recommended for Lenin Prize.

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¹Transliterated titles of Russian articles are given in *italics* like foreign language titles. Translated titles are given in brackets [], and unless otherwise indicated the articles were translated by me for my own use only.

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Most entries are made without distinction between the present Komarov Botanical Institute and its mother institutions, the Botanical Museum of the Academy of Sciences of the USSR and the Imperial Botanic Garden. Persons interested specifically in one of these three institutions should look first under their individual entries. Among other entries institutional breakdown is sometimes given when necessary or helpful, and for this purpose the shorter designations Botanical Institute, Botanical Museum, and Botanic Garden, respectively, are used.

Insofar as possible, correct initials and dates of birth and death are given for each person mentioned in the text. When these initials and/or dates have been added only here in the Index, they are placed in square brackets, "[]."

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To a large degree, this is a history of Russian botany. It is important reading for botanists, historians of science, and those concerned with scientific development in the Soviet Union.



Stanwyn G. Shetler is an Associate Curator of Phanerogams with the Smithsonian Institution's Museum of Natural History. He is in charge of temperate and arctic North American collections, and his specialties are the flora of arctic regions and the systematics of the family Campanulaceae.

Mr. Shetler came into contact with botanists at the Komarov Botanical Institute through his work. His interest in the Institute and in Russian botany was furthered when he visited the Komarov in 1964, its 250th anniversary.

Mr. Shetler was recently appointed executive secretary of the editorial committee for the new *Flora North America* Project. He received his B.S. and M.S. degrees from Cornell University and is currently a candidate in absentia for the Ph.D. degree at the University of Michigan.



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